Game Design Patterns for Designing Stealth Computer Games

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Abstract

Design patterns are widely used in game design, especially in action games. Design patterns can be seen as a group of concluded gameplay. A stealth game is a video game genre that rewards the player for using stealth (conceal avatar of player in order to avoid enemies) to overcome antagonists. In some cases there is a conflict between difficulty and game experience in stealth game. In order to solve this problem, we researched design patterns in stealth games.

We observed a set of stealth game design patterns from three different stealth games. The collection used a different template of game design pattern. Then we created a questionnaire to collect opinions from designers that have experience in stealth game area. Based on such data, we designed and created a prototype of application. Unlike other websites or books, the application shown game design pattern for a single type of game (stealth game). From the application designers can check stealth game design patterns based on design document. The application can introduce stealth game design patterns to designers, and show how to use them in stealth game design.

**Keywords:** stealth game, game design pattern, level design, game experience, app inventor, design document.
Popular Science Summary

In this thesis, our aim is to popularize game design patterns in stealth game design. Design patterns can be seen as a group of concluded gameplay. A stealth game is a video game genre that rewards the player for using stealth (conceal avatar of player in order to avoid enemies) to overcome antagonists. We observed 21 typical stealth game design patterns as a stealth game design pattern collection from three different kinds of stealth games. Designers could follow these patterns, combine them or find new stealth game design patterns that different from those in the collection, in order to develop their own stealth games. We also developed a prototype of an APP: Stealth Game Design Helper including the collection of stealth game design patterns. During the development of a game, designers could look up for and learn about each stealth game design pattern. This APP is a useful tool for game designers when they write concept document or design document.
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<th>Definition</th>
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<tr>
<td>ACT</td>
<td>Action games</td>
</tr>
<tr>
<td>AI</td>
<td>Artificial intelligence</td>
</tr>
<tr>
<td>APP</td>
<td>Application</td>
</tr>
<tr>
<td>FPS</td>
<td>First-person shoot games</td>
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<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
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<td>NPC</td>
<td>Non-player character</td>
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<td>RPG</td>
<td>Role-playing games</td>
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<tr>
<td>SNS</td>
<td>Social Network Software</td>
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<tr>
<td>UI</td>
<td>User Interface</td>
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1 Introduction

This master thesis is based on the concept of design patterns and we utilize design patterns to guide designers to improve a specific type of computer game: stealth game.

Design patterns are widely used in game design, especially in action games (a video game that emphasizes physical challenges, including hide-eye coordination and reaction time). In game design, gameplay is the most important part. Bjork and Holopainen define gameplay as the structures of player interaction with the game system and with the other players in the game [3]. Gameplay includes the possibilities, results, and the reasons for the players to interact with in the game. Game design patterns are a language for talking about gameplay. Design patterns can be seen as providing answers to problems faced by game designers [1]. Here these problems are the gameplay types that occurred over and over again in same type games. Every stage in an action game can be divided into several kinds of basic patterns. Game designers try to combine these patterns in order to create gameplays to players. "Each pattern describes a problem which occurs over and over again in our environment, and then describes the core solution to that problem, in such a way that you can use the solution a million times over, without ever doing it the same way twice" [2]. Bjork and Holopainen [3] define game design patterns as: game design patterns are semiformal interdependent descriptions of commonly reoccurring parts of the design of a game that concern gameplay. Their work became the foundation of this area.

A stealth game is a video game genre that rewards the player for using stealth (conceal avatar of player in order to avoid enemies) to overcome antagonists. According to Smith, the main gameplay of stealth game is to create the illusion of a securely guarded area that the player can sneak through by virtue of leveraging their unique abilities and tools to create and exploit security flaws [35]. Usually, stealth game is a subtype of action games (ACT) or first-person shooter games (FPS), for example, Metal Gear Solid, Tenchu, Splinter Cell, Hitman, and Assassin Creed. Some role-playing games (RPG) may also use stealth elements,
like Elder Scroll V: Skyrim and World of Warcraft. In these games, players meet analogous obstacles and cruising enemies, and how to pass these obstacles without alerting them is a big challenge to players [4].

We will provide a list of game design patterns that can help designers in solving the conflict between difficulty and game experience in stealth game. Designers can find more design patterns from the collection. The thesis can be guide to new designers and help them use a pattern in a proper way. Based on the information we collected during the study, we developed a prototype of an application that can help designers to create their own stealth games.

1.1 Motivation

Design patterns are commonly used in different areas. In game design area, developers cannot use the theory of design patterns directly. Study of game design patterns has two parts: theoretical part (concept of single game design pattern) and application part (design pattern prototype for a specific game). In this thesis, we mainly discuss on how to use theoretical part of game design patterns in stealth game design.

Game developers have to consider two main factors: Level design and game experience. According to Byrne, level design is a game development discipline that involves the creation of video game levels, locales, missions or stages [36]. Level designing has many different aspects, including artificial intelligence (AI) [5]. "Enemies typically have a line of sight which the player can avoid by hiding behind objects, staying in the shadows or moving while the enemy is facing another direction. Enemies can also typically detect when the player touches them or moves within a small, fixed distance."[6] From here we know the intelligence of the enemy is relevant to the difficulty of a level. In this area, Pizzi et al. [7] and Goyal [8] performed research on influences of AI to gameplay and storyboard. Hullett and Whitehead [10] also studied level design in FPS levels, which is similar to stealth game levels. These level design resources are helpful [11]. Currently game design patterns are used in analyzing
level design, but not during level design process. The gap between theory and practice of game
design patterns for level design is a problem facing by all designers.

There is no clear definition of game experience. In our point of view, game experience is
the feeling of gameplay from players. In this thesis we discuss the game experience of game
world that different from real world and game experience from gameplay of stealth game.
Circumstance in game can affect game experience of stealth games [9]. Game designers need
to think about how to create a tight and dangerous circumstance. In some cases there is a
conflict between difficulty and game experience. For example, an enemy cannot see a player’s
avatar in a short distance; an enemy cannot hear the noise made by an avatar. The
compromises could reduce difficulty or bring a bad game experience to players. Gaurnad
found three types of problems in stealth games [33]. Among the three problems, the
easy-fighting mistake is about level design, and the result of more fighting will break the game
experience of stealth, which means break the gameplay of stealth games and bring a bad game
experience to players. The NPC (Non-player character) dead mistake refers to NPC AI, which
is also part of level design. The obvious one alternate path problem refers to both level design
and game experience. Shwartz found another problem in stealth game design, which is a lot of
gun fighting in stealth games [33]. This problem also refers to level design, and background
story of a game, and break game experience about stealth game. In conclusion, the balance
between difficulty and game experience is an essential problem, which need to be solved in
stealth game designing.

Game design patterns have the potential to be applied in stealth game designing, but
currently there are few researches on this area. In this study, we create a collection of stealth
game design patterns collected from three stealth games. We focus on game strategy and game
mechanic design, and not focus on programming. Based on these design patterns we provide a
prototype of application to introduce stealth game design patterns and show how to use them.
1.2 Research Questions

Research Question 1: Which game design patterns should be considered to create stealth game?

Sub-Question 1. Which game design patterns should be considered to make a stealth game level?

Sub-question 2. Which game design patterns should be considered to make a stealth game more realistic?

To answer these questions we use and case study methodologies. We also obtained answers and suggestions from stealth game designers. The use of case study in one or two typical stealth game helped solving this problem.

Research Question 2: How to help game designers in their creative process of developing a stealth game prototype?

To answer this question we used design and creation. We developed a prototype of an application that can help designers in stealth game designing.

1.3 Research Goals

- Help developers to solve the conflict between difficulty and game experience.
- Help developers in their process of creating stealth game.

1.4 Contribution

- A classification of typical design patterns in stealth game
- A prototype of an application that can help designers to create their own stealth games.
1.5 Thesis Overview

Below is an overview of the thesis. The answers to the research questions can be found in the chapters below.

- Chapter 2 - description of the research methodologies.
- Chapter 3 - background and related work from literature review.
- Chapter 4 - description of the case study and results and answers to RQ1.
- Chapter 5 - description of the questionnaire and results and answers to RQ1.
- Chapter 6 - description of the APP prototype and evaluation and answers to RQ2.
- Chapter 7 - discussion and conclusion of the projects, outline of future work.
2 Research Methodology

In this chapter, we show the research methodologies used for this thesis. We used four different types of research methodologies, including literature review, case study, questionnaire and design and creation.

- We choose case study as research method because with a case study we can collect stealth game design patterns directly from stealth games.
- We choose questionnaire as data collection method because it helps us to collect in-depth answer from designers.
- We choose design and creation as research method because we created a prototype of an application that can help designers to create their own stealth games.

We do not use literature review as method due to time limitations. We do not use survey as method because we need in-depth answer about stealth game and survey cannot provide such information. We do not use interview as method because we cannot make an appointment with designers to make an interview since designers come from different countries. In order to collect information from them, questionnaire is better than interview.

In table 1, we can see relationships between our research questions and research methodologies.

<table>
<thead>
<tr>
<th></th>
<th>Case Study</th>
<th>Questionnaire</th>
<th>Design and Creation</th>
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<tbody>
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<td>RQ1.1</td>
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Table 1. Overview of Research Methods
2.1 Case Study

Using typical stealth games as a case study, we attempted to find out how design patterns and game designers interact with players by using these design patterns. We followed Runeson and Höst [30] to build our case study. We study these 3 case within four steps: case study design, preparation for data collection, analysis of collected data, and reporting. This case study can help us solve research question 1.

2.1.1 Chosen Cases

There are more than 10 series of stealth game on PC, including Castle Wolfenstein, Tenchu, Thief, Dishonored, Splinter Cell, Hitman, and Assassin Creed. Even there are not so many stealth games; we still cannot research all of them. Based on the background story of the game, there are two main types: fantasy background and modern background. The difference between the two types is fantasy background games often use magic power, and use cold weapons more in fighting, like sword and arrow, while modern background game often use modern tools, and use hot weapon like guns in fighting. Based on the view of player there are three main types: First person view (Players see what their avatars see), Third person view (Players see from backward of their avatars), Top view (Player see from ceiling).

We chose three stealth games as research cases, which are Dishonored [37], Tom Clancy’s Splinter Cell: Blacklist [38], and The Classroom 3 [39]. In these three games, we only choose main missions/levels/stages are chosen as subjects.

1) Dishonored is a 2012 stealth game developed by Arkane Studios and published by Bethesda Softworks. The game won several awards, including the 2012 Spike Video Game award for Best Action-Adventure Game and the 2013 BAFTA award for Best Game. The reason we choose it as a case is that it provides various possibilities in completing every single missions. Players can use different abilities with different ways to get various results in one mission. Another reason is that the background of the game which is related with magic, and is a main type of background stories. It is a first person view stealth game.
2) Tom Clancy's Splinter Cell: Blacklist is a stealth game published by Ubisoft. It is one of their Splinter Cell series. The reason we choose it as a case is that it is a game in a stealth game series. There are many proven features for stealth games in it, which are useful in making collections of stealth game design patterns. Blacklist has a background relevant to reality, which is another main type of background story. It is a third person view stealth game.

3) Unlike the games above, Classroom 3 is a flash game. This game has a modern background, but there is no fighting element. It uses cheating in exam and stealing exam papers as stealth elements. It also uses top view as player’s view.

2.1.2 Preparation for Data Collection
Since these games cover many main types of stealth games, we focused on design patterns collection as game patterns collection website [17]. To create a collection for stealth games, we followed the instructions by Bjork and Holopainen [3]: Transforming game mechanics into game design patterns and harvesting patterns by analyzing games. Transforming game mechanics into game design patterns included discarding a number of mechanics, merging some mechanics in to one patterns, and identifying more abstract or more specific patterns from already identified patterns. Harvesting patterns by analyzing games was to conduct “brute force” analysis of existing games, concepts and design methods of other fields, and to extrapolate possible person-to-person and person-to-environment interactions from the fields of sociology, social psychology, psychology and cognitive science. We observed and analyzed three cases and concluded the collection of game design patterns for stealth games relevant to stealth game experience, and level design. In the period of data collection, we played three games at least two stages/missions, and then watched walkthroughs of each game on Youtube. Then we observed actions can be done in the games. After that we read the narrative part in games, including story and guide. At last we compared stealth features and game mechanics among these games and concluded them as stealth game design patterns.
2.1.2.1 Background Story
We read background story of each game. From background story we know who the avatar is, what he will do in the game, and what kind of enemy he or she will face to. These provide an overview of the game to every player and give a stealth game experience. For example, in Dishonored, the avatar is a soldier who is framed killing queen; he will fight against the government. He will steal important information and assassinate important person. Here steal things and assassinate person provide an environment of stealth for player.

2.1.2.2 Player View
After background story, players can control avatars by themselves. The first thing is the view in game. First person view can provide a sense that player is the avatar. Third person view can provide more information about environment. Top view can provide whole environment, but less detail of enemy and obstacle. Different views provide different game experience to players.

2.1.2.3 Basic Control
This part including walk, run, hit, shoot and other basic movement that avatar could do controlled by player. In Dishonored and Splinter Cell, the sound of running would attract enemy. In Dishonored, avatar can see through key hole to observe environment. In Splinter Cell, the avatar can hide after an obstacle and fast move between two obstacles. These game mechanics make the game real and provide difficulty in level design.

2.1.2.4 Special Control
In action games, the only choice facing to enemies is kill them. While in stealth game there are other choices like faint enemies, here we focus on special behaviors like mark, sneak and so on. Players can also mark enemies to observe their patrol path. In Dishonored, the avatar can strangle enemies and faint them. In Splinter Cell the avatar has three choices: Avoid enemies or faint them can provide ghost points, assassinate enemies can provide panther points, and kill enemies face to face can provide assault points. The three different types of points affect the assessment of every mission and provide different game experience.
2.1.2.5 Equipment and Ability

In stealth game there are always equipment or ability helping the player to complete missions. In Dishonored the avatar can get sword, gun and crossbow as weapon, and use anesthetic arrow to faint the enemy. The avatar can also use magic like blink to avoid enemy. In Splinter Cell the avatar can use different types of guns, and different suits to reduce the possibility of detecting by enemy. The avatar can also use robot and camera to observe the environment. These game mechanics make the game real and provide difficulty in level design.

2.1.2.6 Environment

In stealth game, the environment includes four parts: paths for avatar to pass one area, obstacles that avatar can hide, traps that can hurt avatar, and things that can be broken or used or collected. In three cases the player can always find obstacles where the avatar can hide. In Dishonored and Splinter Cell the player can choose different paths to complete a mission like walk through or climb a wall. The player can also use things to hold attention of enemies or break lights so that the enemy cannot find the avatar. There are also traps like mines and lasers to hurt the avatar. These game mechanics make the game real and provide difficulty in level design.

2.1.2.7 Enemy

In each case enemies have different equipment or different patrol paths or different field of visions. In Classroom 3 the players can see the field of vision of every enemy so they can control the avatars to avoid enemies. In all three games enemies have settled patrol paths. Players have to observe theses paths and avoid them. These game mechanics make the game real and provide difficulty in level design.

2.1.2.8 Statistics and Assessments

At the end of each mission, there are statistics and assessments provided by game system to show the performance of players in one mission. In order to fulfill the aims like avoiding all enemies or collecting all money in the mission, the players are willing to play one mission again and again. These game mechanics provide difficulty in level design.
2.1.3 Analysis of Collected Data

In this step we analyzed the data.

First, we defined the features that are relevant to stealth including avoid enemy, assassinate enemy, react of enemy, etc. Then we chose keywords that are relevant to stealth, which means these patterns, are unique in stealth games compared with other types of games.

After that we used these keywords as the name of these design patterns, i.e. Action Posture, Alert. We also chose keywords that commonly are used in all types of game.

Then we analyzed the relationships between design patterns and level design, and the relationships between the design patterns and game experience. Level design is a game development discipline that involves the creation of video game levels, locales, missions or stages [36] Based on the definition, design patterns that relevant to:

1. Enemy: Including ability of enemy, number of enemy
2. Character ability: Including actions, equipment
3. Circumstance: Including building, materials, traps

These design patterns can affect level design. On the other hand, there is no clear definition of game experience. In our point of view, game experience is the feeling of gameplay from players. In this thesis we discuss the game experience of game world that different from real world and game expereince from gameplay of stealth game. These design patterns refer to:

1. Ability of enemy: Like how far can he see, the reaction to sound, the reaction of lost other enemy, etc.
2. Game mechanics: Including sounds made by player (foot step sound, sound of gun-shot), light

Based on these standards, we analyzed the relationship of design patterns and level design and game experience.
2.1.4 Reporting

In this step, we wrote a report on the collection from all the patterns. We divided patterns into two types: commonly used in all games, and specific in stealth games. There are four parts in every single stealth game design patterns.

For the commonly used patterns like Background Story, we followed the well-known names, and focused on the unique part that stealth game owns. We also focused on the special use of the pattern in stealth game. For example, background story bring better game experience.

For the less common patterns in stealth games, we followed the suggestions from Bjork and Holopainen [3] to create a proper name, and describe the unique part of the stealth game design pattern.

2.2 Questionnaire

Questionnaire is a data collection method that can collect data from experts in specific areas. Questionnaires are a central data collection method for exploring ‘data on understandings, opinions, what people remember doing, attitudes, feelings and the like, that people have in common’ [31]. We follow the steps provide by Neuman[40]: (1) defining questionnaire objectives, (2) selecting a sample, (3) designing the questionnaire format, (4) pretesting the questionnaire, (5) precontacting the sample, (6) distributing the questionnaire, (7) following up with no respondents, and (8) analyzing questionnaire data. Questionnaire can help us solve research question 1, including sub-question 1 and 2.

2.2.1 Defining Questionnaire Objectives

Our aim is to collect opinions about game design patterns using in stealth games provided by stealth game designers and developers. We focus on two areas: game experience and level design. Based on the aim and research question, the objectives are:

- To investigate the popularity of using game design patterns in stealth game design
- To collect opinions of factors that can affect game experience in stealth game design
To collect opinions of factors that can affect level design in stealth game design

2.2.2 Defining Questionnaire Format

We will not only follow some preset questions but also include additional questions in response to participant comments and reactions. We create questions based on Silverman’s book [31]. Questionnaire questions are defined in the following areas:

- **Behaviors**: what a person has done
- **Opinions/attitudes/values**: what a person thinks
- **Feelings**: what a person feels
- **Knowledge**: what a person knows
- **Senses**: what a person has seen, touched, heard, tasted, and smelled.

There are three types of questions: Initial, In-depth and Follow up questions. Based on every type of question, we create a group of questions for the interview.

| **1. Direct/descriptive/linear questions** | To elicit general often introductory information |
| **2. Narrative questions** | To elicit stories |
| **3. Structural questions** | To learn about basic processes needed to understand the participant’s experience |

**Table 2: Template of Initial Questions**

Based on the template in table 2, we create three initial questions:

1. Could you tell me what you do in designing?
2. Do you know about design patterns?
3. What are the stages involved in creating a prototype of a game?
1. **Contrast questions**
   - To encourage participants to think about extreme cases

2. **Evaluative questions**
   - To enable participants to make a judgment

3. **Circular questions**
   - To encourage meta-thinking

4. **Comparative questions**
   - To enable participants to put their own experiences in perspective

**Table 3: Template of In-depth Questions**

Based on the template in table 3, we create nine in-depth questions. Here “-1” means the question based on sub-question 1, “-2” means the question based on sub-question 2, “-3” means the question based on RQ2. Here we did not use circular questions, because it is not necessary in our interview.

1-1. What makes a level design in stealth game a good design or a bad design?
1-2. What makes a game experience in stealth game a real experience or a fake experience?
1-3. What makes a prototype of a stealth game a good one or a bad one?
2-1. How do you feel design patterns using for level design in stealth game?
2-2. How do you feel design patterns using for game experience in stealth game?
2-3. How do you feel design patterns using for prototyping in stealth game?
4-1. Do you think design patterns can be helpful in level design? How can it help level design, especially in stealth game?
4-2. Do you think design patterns can be helpful in getting a more real game experience in stealth game? For example, reaction of enemies to noise, light, etc.
4-3. Do you think design patterns can be used in creating prototype of a stealth game? How do you think designers can use it?
<table>
<thead>
<tr>
<th>1. Verification questions</th>
<th>To provide a paraphrase in order to check understanding</th>
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<tbody>
<tr>
<td>2. Prompts and probes</td>
<td>To enable participants to go deeper in to an idea or example, to elaborate</td>
</tr>
<tr>
<td>3. Follow up Questions</td>
<td>To elicit additional information in order to clarify confirm, or extend</td>
</tr>
<tr>
<td>4. Closure questions</td>
<td>To tie up a line of questioning or idea</td>
</tr>
</tbody>
</table>

Table 4: Template of Follow-up questions

Based on the template in table 4, we create two templates. The number of real questions will change with information of answers from interviewees.

1. Can you tell me a bit more about XXX (based on other questions)
2. Can you give me an example about XXX (based on other questions)

2.2.3 Target population and precontacting

The target groups of our questionnaire are designers with experience in stealth game design, and developers who are interested in stealth game design.

We chose participants in two ways:

1) Check staff list of stealth games, contact with designers and invite them to participate interviews.
2) Participate in game designers groups on Social Network Software (SNS), like Linkedin and Facebook, and then ask questions to all designers in the groups. We did not get any feedback from Linkedin.

2.2.4 Following up with nonrespondents

We contacted 5 designers with experience in stealth game design, and only one (Dishonored designer: Ricardo Bare) responded. We posted questionnaire on Linkedin and Facebook groups, 10 people show interest in the questionnaire, but none of them give a complete feedback, three participants (Individual game developer: Jonathan Pasamonte, Individual
game developer: Rene Haefferer, Lecturer in university: August Ray) give some answers of the questionnaire.

2.3 Design and creation

Design and creation is a methodology commonly used by researchers who focus on developing new applications. We create a software artifact and according to Oates [29], the design and creation approach is focused on developing software artifacts. We also follow the research framework defined by March and Smith [41]. There are four main artifacts (constructs, model, method and instantiation) in the framework that are mapped with four main activities (build, evaluate, theorize and justify). This makes design and creation a good choice for our research as we build and evaluate a stealth game design patterns checker that is an instantiation artifact. Design and creation can help us solve research question 2.

First of all we identified the requirements from the questionnaire shown in section 2.3. Then we developed the prototype through a series of customizing, testing and debugging of the source code based on the data collection from case study in section 2.2. At last we evaluated the prototype through feedback of designers.

2.3.1 Evaluation

Evaluation is another important part of the design and creation approach. After developing any IT artifact, it is necessary to be evaluated for which the artifact was developed [29]. Oates also describes three different approaches in evaluating a prototype, which are proof of concept, proof by demonstration and real-world evaluation [29]. Here we used the proof of concept approach for the design. Proof by demonstration and real-world evaluation is not necessary at this stage.

We found participants from social network software (Linkedin group and Facebook group). The participant should have knowledge in game designing and developing. We also ask questionnaire participants for feedback. Unfortunately, we did not get proper participants from Linkedin group or Facebook group. We collected feedback from three game designers.
who are also participants of questionnaire. Their feedback show the advantage and
disadvantage of the prototype.
3 Literature Review

In this section, we provide some background and related work relevant to our project. We followed the recommendations from Dawson [12]. Our literature review is split into two stages:

1) Reviewing the literature as first step of research process;
2) Reviewing the literature while conducting the research.

There is no previous research in design patterns usage in stealth games. Actually, stealth game itself is not a popular research area. Beattie [4] completed a study in interactive media of stealth game, but not in game design. Martin [28] did research in Splinter Cell on spatial analysis of NPC. On the other hand, game design patterns are commonly researched because of its diversity and popularity.

3.1 Game Design Patterns

Game design patterns can be useful in game design. According to Bjork and Holopainen [13], a game design patterns can solve problems within game interaction design because designers can always find wanted solutions within the patterns. From these concepts provided by game design patterns collection, a designer can find a core of gameplay, or make a game different to existing ones, so that game design patterns can be treated at as a creative design tool. Game design patterns can also help designers communicate with peers or other professions, because it turns features of a game into a common concept, which can be seen as a kind of design language. Game design patterns can be used in several areas. In this thesis, how to use game design patterns is one of the research problems. Based on the article of Holopainen and Bjork [13], researchers can use existing design patterns collection or create design patterns collection by themselves. Both ways can be used in game analysis. Using existing design patterns collection, for example, game design patterns website [17], needs researcher´s deep understanding in it. Creating design patterns collection by themselves require ability of observation and analysis. Most researchers choose creating a collection of game design
patterns for a specific area. For instance, Cermak-Sassenrath [14] and Mcgee [15] created their own collection in their research. Cermak-Sassenrath used action game design patterns as a collection to teach students designing an old-school action games named “Super bush! Chronicles”, which proved that game design patterns can be useful in game designing, especially for beginners. Mcgee tried to show how to create and use a design pattern. He use three steps: pattern creation, pattern improvement, pattern-based innovation. Except for beginners, game design patterns can also be used in other areas. Lewis, Wardrip-Furin and Whitehead [16] term a specific collection for village game. By analyzing these design patterns in behavioral economics and psychology, they explained how social network games engage and retain players. Based on this research, we believe that game design pattern is a useful concept in game designing. In this thesis, we created a collection for stealth games, in order to analyze stealth games and design.

Case study is an essential research methodology in game design patterns usage. Researchers use different cases to collect and integrate design patterns. Lewis et al. [16] take village game from Zynga as cases. Ampatzoglou et al. [18] use 97 successful open source games as cases to research computer game defects. Bergstorm, Bjork and Lundgren [20] research camaraderie in four games to show aesthetical gameplay. All of the analysis games were based on a collection of design patterns. Following the definition of each design pattern, researchers can find features of a game fast, and analyze them by different classification. In the thesis we used three stealth games as cases in the case studies to collect and analyze design patterns.

3.2 Game Design Patterns in Level Design

Level design is always relevant to gameplay, which gives players a good game experience. Using game design patterns in level design can help designer create a level faster. Hullet and Whitehead [10] research using design patterns in FPS level design. FPS games are similar to stealth games, there are many factors in their article can be learned. They divide patterns based
on four different classification, and find examples from game. They use 10 design patterns explaining relationship between level elements and gameplay. Milam and El Nasr [19] [21] also research design patterns using in level design. They visualize some level design patterns in 3D games for guiding player movement. Every single design pattern leads a goal of designer want player to do, in order to provide gameplay. They also analyze six specific level design patterns in 21 games, in order to identify unique level affordance configurations including combat, environmental resistance, and mixed goal with low vulnerability. Dahlskog and Togelius [1] research level design in Mario. They identified typical level design patterns, and then combined them by using procedural content generation. They can create different stages with different difficulties by using the two concepts. All these preexisting articles can help and guide us in analyzing stealth games.

### 3.3 Game Design Patterns and Realistic Game

Nowadays players require more and more realistic game, not only environment, but also AI, behavior and so on. There is little research about reality designing in stealth game. Therefore, we tried to find some articles about realistic game, in order to find some elements relevant to stealth game. Milam, Bartram and El Nasr [22] research three game design patterns. They are special to the visual presentation of game elements, which can hold attention of players. The three design patterns can be considered in stealth game. In Tennet’s article [23], they mentioned breath factor in game design pattern sneak’em-up, which is also relevant to stealth game. Pellens, De Troyer and Kleinermann [24] talk about model behavior using design patterns for X3D worlds. It’s not game design patterns, but the model behavior patterns can be a reference for stealth game. We did not find articles about relationships between realities of game experience with game design patterns.

### 3.4 Game Engine Based on Game Design Patterns

In order to make prototype or concept of a stealth game, a game engine is necessary. Game engine is a software tool that can be used in game design. We tried to find an engine that can
create prototype by using design patterns. Designers do not need to create game scene in detail, they only need to point out what kind of design patterns should be used in a specific period. McNaughton [26] has a research in using ScriptEase for Computer Role-playing Games. In this article they identified four problems with using generative design patterns, which are generality, performance, coverage and evolution. ScriptEase as a tool is a good solution to these problems. We also take ScriptEase in consider as engine for stealth games, but it is better for RPG. Even though we can still learn its architecture to use for stealth game engine.

Nummenmaa, Kuittinen and Holopainen [27] tried to use DisCo ad game design tool, which is also a good example to us, especially its development process. In conclusion, we did not find a right engine that can fulfill our need. So we searched articles about application that can help stealth game designing, and we still did not find a proper article in this area.

In conclusion, from literature review we found:

1. Game design patterns are helpful in game designing, often as a research tool.
2. Some proved methods from articles to collect and identify design patterns
3. Design patterns can be used to analyze level design
4. There are less articles about relationship between game experience and game design pattern
5. We did not find any game engine or application that fulfill our need to shwo design patterns directly to designers.
4 Case Study

In this chapter, we use typical stealth games as case, in order to know design patterns and how game designers’ interaction with players by using these design patterns.

4.1 Research Questions

RQ1: Which game design patterns should be considered to create stealth game by using game design patterns?

Sub-question 1. Which game design patterns should be considered to make a stealth game level when using game design patterns?

Sub-question 2. Which game design patterns should be considered to make a stealth game more realistic when using game design patterns?

4.2 Theory

Based on Bjork and Holopainen [3], game design patterns can be useful in game design. In order to use game design patterns, researchers can contact game design pattern collection presenters, or scratch and build new collection of patterns. Since stealth game is a specific type of game, we create a collection of game design patterns for stealth games. In this collection, we focus on the patterns relevant to stealth game experience and level design. According to Hullet and Whitehead [10], game design patterns should be as follows:

- Noticing and naming common structures that produce specific types of gameplay,
- describing the key characteristics of these structures and how they affect gameplay,
- helping the designer address level design concerns in a logical way, and
- allowing for different approaches to create the desired gameplay.

In our thesis, we focus on stealth game, level design and game experience. So these features change to:

- Noticing and naming common structures that produce level design and game experience in stealth game,
- describing the key characteristics of these structures and how they affect level design
and game experience in stealth game,

- helping the designer address level design and game experience concerns in a logical way, and

- allowing for different approaches to create the desired stealth game.

We also adapted the game design pattern template from Hullet and Whitehead [10]. The template consists of 5 parts: Name, Description, Consequence, Using the Pattern and Relationships. Kreimer use another template, which include a solution part. Unlike design patterns in other area, there could be several different solutions for one problem, so Bjork and Holopainen merge ‘solution’ part into ‘using the pattern’ part [13]. In this thesis we focus on concluding game design patterns about level design and game experience in stealth game, not the relationships between these design patterns, so we removed relationships part. We measure the relationship of game design pattern and level design by judging how the game design pattern affect level design. We measure the relationship of game design patterns and game experience by comparing game world and real world. The template consists of four parts:

- Name: Name of the pattern. It should be short and expressive.

- Description: Describe a problem in designing, or a characteristic in a stealth game.

- Consequence: Consequence of gameplay. Here we write the relationships of pattern with level design and game experience about reality.

- Using the Pattern: How to use the pattern in stealth game, with some choices. Here we write examples from three cases in this part, in order to give an explanation with examples.
4.3 Objective

We aimed to collect and identify stealth game design patterns from three cases. After that we will analyzed these stealth game design patterns based on research questions. Thus, there are two main objectives:

- Create a collection of game design patterns for stealth games.
- Use the collection to answer our research questions.

4.4 Result (Stealth Game Design Patterns Relevant to Game Experience and Level design)

4.4.1 Ability and Equipment

**Pattern name:** Ability and Equipment

**Description:** Players need special ability that owned by avatar or use special equipment to help sneaking or assassinating. Designers have to provide some skills and items to fulfill these needs. Ability and equipment are often looked as two kinds of design patterns, but in stealth game, they can be looked as same pattern that help player doing better.

**Consequence:** Ability and Equipment can affect game experience. For instance, in an agent background avatar with high-tech equipment can create a better environment, which makes players feel the game world is realistic. Ability and Equipment can also affect level design. Designers can assume players have to use one or more abilities or equipment. Skilled player can combine different abilities to lower difficulty. Master Player need challenge can try to play the game not using abilities and equipment.

**Using the pattern (in 3 cases):** Abilities are commonly used in early stage of a game, often with a practice level for players to familiar. Player can set abilities during game. Before starting a stage, there is always a scene for player to check equipment, here they can know detail of an item, or choose items they want to use for next stage. Designers often give a limit to abilities and equipment, for example using ability with settled energy like magic point, or
maximum number of an item. With such limits designers can control the difficulty of the game. Ability and Equipment can also linked with Collect factors to upgrade their power.

**Figure 1:** Ability: Blink in Dishonored

![Ability: Blink in Dishonored](image)

**Figure 2:** Equipment in Splinter Cell: Blacklist

From figure1 we can see ability in Dishonored. There are ten skills in Dishonored, six active skills and four passive skills. All of them can upgrade to improve their power. On the other hand, player can choose not using any abilities as a challenge.
From figure 2 we can see an equipment check scene in Splinter Cell: Blacklist. Player can check, change, upgrade items for Sam Fisher, in order to get better help in next stage.

4.4.2 Achievement

Pattern name: Achievement

Description: In order to induce player using different ways to finish a game, designers often set a series of badges with different conditions. Achievement can always be shown on web, so players’ friends can see these achievements, which also promote players challenging these achievements.

Consequence: Achievement can affect game experience. Players can use ways that suggested in the requests of achievement to play same part of game to get the achievement. Designers can also design achievements based on level.

Using the pattern (in 3 cases): Achievements are in a list with explanations of requests. Players have to fulfill the requests to unlock achievements. Except shown on website, designers can also give rewards based on the numbers of unlocked achievements.

![Achievement in Dishonored](image.png)

**Figure 3:** Achievement in Dishonored

In figure 3 we can see Achievement in Dishonored. When players fulfill the request of an achievement, the icon will be shown on the left side of screen with a explanation.
4.4.3 Action Posture

**Pattern name:** Action Posture

**Description:** In stealth game, designers often use stealth posture to tell player that the avatar is sneaking and hard to be detected. In such posture avatar can get positive effect for stealth like no sound while walking. They may also get negative effect for other side like lower walk speed. There are also other postures like crawl posture.

**Consequence:** Action Posture may affect game experience. Players may feel the game is more realistic when the avatar in a specific posture and can’t detected by enemies. Action Posture can also affect level design. Designers can design levels for specific posture.

**Using the pattern (in 3 cases):** Players can press a button to enter specific action posture. Avatar can have actions different from other postures. Posture can give avatar positive and negative effects. Players can distinguish postures by different appearances of the avatar. Designers can also use an icon to show the posture of the avatar.

![Figure 4: Action Posture: Stealth Mode in Dishonored](image)

In figure 4 we can see action posture: stealth mode in Dishonored. Positive effects are hard to be detected, and keep silence while walking. Negative effect is lower walk speed.
4.4.4 Alert

**Pattern name:** Alert

**Description:** There are two types of pattern alert: avatar alert and enemy alert. Enemy detected avatar alert means a sign that tell players their avatar. Enemy alert means a sign that tell players which ones of the enemies’ detected avatar. When enemy, or other enemy body detects avatar is detected, or a trap work, the alarm starts. After alarm there would be a lot of enemies, or may due to mission failed.

**Consequence:** Alert can affect level design and game experience. In order not to let the mission failed or face to a lot of enemies, players have to hide their avatars and not be detected by enemies. So they will observe the map and find obstacles, supplements to help them. Trying to avoid enemies can create a nervous feeling, which makes the game realistic. Sometimes, players can trigger an alert deliberately to hold attention of enemies.

**Using the pattern (in 3 cases):** Designers can use alarm light, siren as a sign that enemy are in the state of alert. Designers can also use marks to show which enemies are in state of alert, in order to be distinguished with normal enemies.

![Figure 5: Alert: Mark in Dishonored](image-url)
Figure 6: Alert: Sign in Splinter Cell: Blacklist

Figure 7: Alert: Alarm Light in Splinter Cell: Blacklist
In figure 5 we can see alarm mark in Dishonored. Enemy in state of alert will have a special mark on their head. And they will start to search avatar.

In figure 6 we can see alarm sign in Splinter Cell: Blacklist. The sign can show the direction that enemy in state of alert. If they detect avatar, they will start to attack. In figure 7 we can see alarm light in Splinter Cell: Blacklist. The green lights on Sam Fisher’s suit can be seen as the most famous feature of Splinter Cell series. Player can see Sam Fisher clearly with the help of green lights when he is in shadow. If enemy detects Sam Fisher, the light will turn red.

In figure 8 we can see pattern alert in Classroom. The field of vision from teacher turns to red when avatar is detected not in safe zone.

4.4.5 Background Story

**Pattern name:** Background Story

**Description:** Background Story is a narrative about the game world, which the avatar is, and
what should players do in the game. Player can get a brief impression of the game from background story.

**Consequence:** Background story can affect game experience. Players get first impression from background story, and then assume what should they do in game. Assassinate someone? Steal important information? A successful story can make the game realistic.

**Using the pattern (in 3 cases):** Background Story is often used at the start part of a game. From opening CG, character introduce, mission description, designers can give enough information for players to know what they should do in game. Designers can also show background from the style of architecture and decoration.

![Figure 9: Background Story: Decoration in Classroom](image)

In figure 9 we can see decoration that tells background story in Classroom. School and classroom seems irrelevant to stealth game, but designer use cheating in exam as a concept to create a stealth game: avatar has to copy target answer and avoid the vision of teacher. The decoration of the game explains that avatar is a student who is in exam.

In Dishonored, player can know name and identity of the avatar from start part of game.
In Splinter Cell, Sam Fisher is a famous character as a spy in the game world, player can also know more about him from novel.

4.4.6 Collection Factor

**Pattern name:** Collection Factor

**Description:** Collection Factor is items that can be collected in the map. It can be part of achievement or ability and equipment, like player collect specific items to get an achievement, or get better equipment, or upgrade an ability.

**Consequence:** Collection Factor can affect level design. Designers can put items in different place in map for different purposes like fulfill request of an achievement, or test skill and observation of players.

**Using the pattern (in 3 cases):** In Dishonored, player can collect money, rune (to upgrade ability), weapons, bone charm (get special ability), outsider shrine, and painting. They can be found from enemy, normal place or secret room. In Splinter Cell: Blacklist, player can check items can be collected for every level.

4.4.7 Difficulty Selection

**Pattern name:** Difficulty Selection

**Description:** Players with different needs, experience and skills need different difficulties. Designers have to give them an opportunity to choose difficulty by player themselves.

**Consequence:** Difficulty selection can effect game experience. A wrong choice of difficulty could bring bad experience to players for too hard or too easy to them. Designer have to consider different difficulties when designing a level, which may involve sensitivity, AI, patrol routes, damage of enemy. Different difficulties can also let players are willing to play the game again with another difficulty.

**Using the pattern (in 3 cases):** Difficulty Selection is often chosen before player start a new game. Designer can provide at least two options to player. In different difficulties there are different levels of enemy, limit of supplements. Designers can also let player choose difficulty when playing game. It can help players find a proper difficulty and don’t have to restart the
game and do another choice.

Figure 10: Difficulty Selection in Dishonored

Figure 11: Difficulty Selection in Splinter Cell: Blacklist
<table>
<thead>
<tr>
<th></th>
<th>Easy</th>
<th>Normal</th>
<th>Hard</th>
<th>Very Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage from enemy</td>
<td>Low</td>
<td>Normal</td>
<td>High</td>
<td>highest</td>
</tr>
<tr>
<td>Potions</td>
<td>More</td>
<td>Normal</td>
<td>Normal</td>
<td>less</td>
</tr>
<tr>
<td>Sensitivity of enemy</td>
<td>Normal</td>
<td>Normal</td>
<td>High</td>
<td>highest</td>
</tr>
<tr>
<td>Recovery speed</td>
<td>Fast</td>
<td>Normal</td>
<td>Normal</td>
<td>normal</td>
</tr>
</tbody>
</table>

**Table 5:** Difference of Difficulties in Dishonored

From Figure 10 and Table 1 we can see Difficulty Selection and its effect in Dishonored. From Figure 11 we can see Difficulty Selection in Splinter Cell: Blacklist. In higher difficulty of Splinter Cell: Blacklist, there are also some restrictions for abilities of avatar: No execute ability, sonar goggles can’t see through walls, and no restocking at supply caches.

**4.4.8 Enemy Type**

**Pattern name:** Enemy Type

**Description:** Enemies in a game cannot be same. Different types of enemy with different abilities can make players feeling much more interests in game.

**Consequence:** Enemy Type can affect level design. Face to different enemies, player have to find different solutions. Combination of different types of enemy can also rise the difficulty of the game.

**Using the pattern (in 3 cases):** Different types of enemy can have different abilities or equip different items. In Dishonored there are more than ten types of enemy. Except normal one, there are also rats, dog, fish, assassin, robot, and so on. Some types have larger detection range like dog; some types have ability like assassin can blink, and some types have high damage like robot. In Splinter Cell: Blacklist, basically there are five types of enemy: soldier, heavy armor soldier, commando, and dog and remote control car. Human enemies in Blacklist with different equipments have different abilities, like soldier with flashlight has larger detection range and can find Sam Fisher in shadow.
4.4.9 Field of Vision

**Pattern name:** Field of Vision

**Description:** Field of Vision is a detail of vision detection range. Through field of vision player know how far avatar near an enemy can. Unlike real-world human, enemy in game world has a limited field of vision.

**Consequence:** Field of Vision can affect game experience and level design. In this game design pattern, game experience and level design are conflicting to each other. More realistic game experience means avatar can be easier to be detected which make difficulty to level design. Now designers often use lower field of vision to make the game not that hard.

**Using the pattern (in 3 cases):** Different types of enemy may have different field of vision. Even though, the most sensitive enemy won’t have a vision longer than 10 meters (except sniper).

![Field of Vision in Classroom](image)

**Figure 12:** Field of Vision in Classroom

In figure 12 we can see field of vision in Classroom. In some situations, the field of vision may widen. In Dishonored and Splinter Cell: Blacklist, enemy’s field of vision is only about
60 degrees and no more than 10 meters.

4.4.10 Hostage

**Pattern name:** Hostage

**Description:** In stealth games, there is a kind of mission that ask player to save or hijack a hostage. In order to complete mission, player has to plan escape route because going with hostage may bring disadvantages to avatar.

**Consequence:** Hostage can affect game experience and level design. Designers can add some rules while avatar going with hostage like can't sneak, can't choose some routes that avatar can go alone. Designers can also add more enemies when avatar moving with hostage. These rules are not only making level more difficult, but also make player feel realistic.

**Using the pattern (in 3 cases):** There are two types of hostage: have consciousness or have not. In first type, avatar has to control hostage not running away. In second type, avatar has to carry hostage by himself, which make some limits to his behavior.

![Figure 13: Hostage in Splinter Cell: Blacklist](image-url)
In figure 13 we can see hostage in Splinter Cell: Blacklist. Sam Fisher has to use one of his hand-controlling hostage. While moving with hostage a lot of actions are abandoned.

In Dishonored there is a mission require avatar hijacking a hostage, he has to stun the hostage and carry the hostage to destination.

4.4.11 Light and Shadow

**Pattern name:** Light and Shadow

**Description:** In order to hide avatar, players have to let avatar stay in shadow. Players can break light to create a shadow area by themselves.

**Consequence:** Light and Shadow can affect game experience and level design. Enemies can be designed sensitive to light, which means when a light is broken, enemies can detect such usual situation and check. Player can use this skill to hold attention of enemy.

**Using the pattern (in 3 cases):** Designers have to consider the position of light, and how big shadow area it can make. Sometimes designers also have to consider the shadow of avatar, which means enemy, can see the shadow and then become in the state of alert.

![Figure 14: Shadow in Classroom](image-url)
From figure 14 we can see shadow in Classroom. Even avatar in the vision of teacher, he isn’t detected by teachers. On the top there is a closing eye, means avatar is in shadow and can’t be detected. In figure 12 we can see the eye is open, which means avatar can be detected.

In Splinter Cell: Blacklist, Sam Fisher can turn on and turn off the light by pressing switch, or shoot lights to turn them off. Both actions can attract enemy, which can help players use different ways avoiding enemies.

4.4.12 Mark

**Pattern name:** Mark

**Description:** Players can kill all enemies in other types of game, but in stealth game, player have to focus on observing and avoiding enemy, which means they need marks to make signs some enemies.

**Consequence:** Mark can affect game experience. Mark is helpful while playing game because players can observe enemies’ location and patrol route easily. On the other hand, it can reduce reality of the game because in real world, one cannot mark other ones.

**Using the pattern (in 3 cases):** Players can mark enemies in game by pressing settled button. Designers may create some restrictions in number and distance.

![Mark in Splinter Cell: Blacklist](image)

**Figure 15:** Mark in Splinter Cell: Blacklist
In figure 15 we can see mark and radar in Splinter Cell: Blacklist. Sam Fisher can mark three enemies at most, these marked enemies can be shown with special mark on radar. Marks can be seen even enemies are behind obstacle.

4.4.13 Neither Damage nor Moving Actions

**Pattern name:** Neither Damage nor Moving Actions

**Description:** Neither Damage nor Moving Actions can be used as stunning enemy, observing, holding attention. These actions may not necessary in other action games, but in stealth games they are valuable game experience.

**Consequence:** Neither Damage nor Moving Actions can affect level design and game experience. No lethal is an important concept in stealth game, and neither damage nor moving actions provide plenty game experience for stealth. Based on these actions designers can also design levels like hold enemies’ attention in order to avoid them.

**Using the pattern (in 3 cases):** Neither Damage nor moving Actions can be divided in to three types: stun enemy, including stun, shoot enemy with anesthesia bullet, throw no lethal grenade; observe, including lean around corner, steal; hold attention, including turn on/off machine, make noise, shoot lights.

![Figure 16: Leaning around corner in Dishonored](image)
In figure 16 we can see leaning aroid corner in Dishonored, which is a typical observe action of neither damage nor moving action. Player can observer enemy without being detected.

In figure 17 we can see throwing tear gas grenade in Splinter Cell: Blacklist. Sam Fisher uses no lethal weapon helping him avoiding enemies instead of killing them.

4.4.14 Observation

**Pattern name:** Observation

**Description:** In order to avoid enemy, players have to observe enemy configuration, patrol route, escape route, and then make a plan. How to observation become an important question in game designing. Basically avatar can observe based on ability and equipment, or neither damage nor moving action.

**Consequence:** Observation can affect game experience. Data collection is an important and unique part in stealth game, observation part makes game real.

**Using the pattern (in 3 cases):** Players can use settled ability or equipment, or use neither damage nor moving action to observe. It could be a long time because patrol route of enemy
could be a long way, so player can also mark enemies then observe them.

![Figure 18: Ability: Dark Vision in Dishonored](image1)

**Figure 18:** Ability: Dark Vision in Dishonored

![Figure 19: Observing through keyhole in Dishonored](image2)

**Figure 19:** Observing through keyhole in Dishonored

In figure 18 and 19 we can see observation in Dishonored. Avatar can use dark vision see through dark and wall to collect enemy information. Avatar can also watch through keyhole to observe.

In Splinter Cell: Blacklist there are similar ways for observation. Sam Fisher can use sonar
detect through wall, and observe enemy by using camera through gap under a door.

4.4.15 Obstacle

**Pattern name:** Obstacle

**Description:** In action games, obstacle is commonly used to lead player to specific route, or test jump skill. But in stealth game, obstacle can be used to hide or cover avatar, so avatar can escape from enemies.

**Consequence:** Obstacle can affect level design. Designers can combine uses of obstacle to enrich methods of level design.

**Using the pattern (in 3 cases):** Obstacle can be divided as two types: moveable and unmovable obstacle. Unmovable obstacle is widely used in game to hide and cover avatar. Movable obstacle can be used to block enemies.

![Image](image-url)

**Figure 20:** Cover in Splinter Cell: Blacklist

In figure 20 we can see cover in Splinter Cell: Blacklist. Sam Fisher can not only use these obstacles as cover, but also move from cover to cover rapidly without being detected by enemies. This Cover Move is a special action in this game, which can create a stealth feeling to players.
4.4.16 Option

**Pattern name:** Option

**Description:** Option is often used in plot of game. Different choices due to different stories. But in stealth game, option can be seen as a choice of game style: kill all enemies, stun all enemies, and avoid all enemies. Stealth game often provide multiple options to help player forming their own play styles.

**Consequence:** Option can affect level design and game experience. Different options due to different stories, means designers may have to prepare different levels for each stories, or same story with different difficulties. Making choices by players themselves can bring players into the role, so they can get better game experience.

**Using the pattern (in 3 cases):** Option can be used in two ways: decide plot of the game, decide play style of the game. Designers can simply provide different options to player to let them decide the plot of the game. Player can decide play style by choosing weapons.

**Figure 21:** Play style options in Dishonored
In figure 21 and 22 we can see option in Dishonored. Player can choose kill enemy or stun enemy. The amount of killing enemies can affect ending and difficulty of the game. In figure 22, based on players’ choose the ending of the mission would be different.

In figure 23 we can see play style options in Splinter Cell: Blacklist. Sam Fisher can kill
enemy or only stun them. This choice affect assessment of every level. There are also plot options in Blacklist, but they can’t affect ending.

4.4.17 Patrol

Pattern name: Patrol

Description: In action games, not all enemies are stand still. Some enemies may walk around as settled route, which is patrol. In stealth game, players have to observe the patrol route and then kill/stun/avoid these enemies.

Consequence: Patrol can affect game experience and level design. Designers can combine different groups of enemy with different patrol routes, which can increase difficulty of observation and assassination/avoiding.

Using the pattern (in 3 cases): Designers can set patrol route of single enemy or enemy group. After observing patrol routes, player can kill single enemy secretly, or avoid enemy group that hard to kill all of them.

4.4.18 Sound

Pattern name: Sound

Description: Sound is another detection factor except vision. When enemies hear unusual sound, they will be in state of alert and check the source of sound. When avatar doing some actions like run, jump, shoot, they will make unusual sound.

Consequence: Sound can affect level design and game experience. Designers face to a same problem as field of vision: how sensitive to sound should enemy be? As sensitive as real world human can make game real, but it may be too difficult to players and hard to design the level.

Using the pattern (in 3 cases): Same as field of vision, some enemies can be designed to be more sensitive to sound. Sound can also be used as a way to hold attention of enemy. Because actions like run, jump, shoot will make noise, designers can design relevant action posture, ability, and item to reduce the voice.

4.4.19 Statistics and Assessment

Pattern name: Statistics and Assessment
**Description:** Statistics and assessment are not design patterns in normal game because they can only record what players do in game. But in stealth game with achievement, it can force player playing game in different styles. Players like killing all enemies would like to try to avoid every enemy in order to get an achievement, here statistics and assessment can tell players complete the request of achievement or not.

**Consequence:** Statistics and assessment can affect game experience. Compared with an icon of badge, detail statistics and assessment can bring more satisfaction to players themselves. Statistics can also help players completing collection factors.

**Using the pattern (in 3 cases):** Basically statistics and assessment interface will be shown after a mission or a stage. Player can check almost everything from the interface.

![Assessment in Splinter Cell: Blacklist](image)

**Figure 24:** Assessment in Splinter Cell: Blacklist

From figure 24 we can see assessment interface in Splinter Cell: Blacklist. There are three scores on the left side which are ghost (style of avoiding enemy), panther (style of assassinating enemy), and assault (style of fighting with enemy face to face). Based on play styles player can get different medal. In order to get gold medal, player may have to think
more about the mission and play several times.

4.4.20 Trap

**Pattern name:** Trap

**Description:** Trap is a kind of equipment that can hurt avatar. In stealth game, an equipment that can detect avatar can also be useful, because when a detection trap is touched off, it can bring more enemies.

**Consequence:** Trap can affect game experience and level design. Trap can be seen as a kind of enemy who standing still but more harmful, and may not be easy to be found. Trap can test observation skill of players, and make the level more difficult and dangerous.

**Using the pattern (in 3 cases):** Traps can be divided in to three types: harm trap, hide trap and detect trap. Harm trap can test dodging skill, hide trap can test observing skill, and detect trap can test both dodging and observing skills.

![Figure 25: Trap in Dishonored](image_url)
In figure 25 we can see hide trap in Dishonored. Avatar has to find out the trap and remove it. Parts of the trap can be used as items.

In figure 26 we can see detect trap in Splinter Cell: Blacklist. Sam Fisher has to avoid the laser in order not to be detected by enemy.

4.4.21 View of Player

**Pattern name:** View of Player

**Description:** In order to present game world to players, view of player is a necessary game design pattern. First-person view and third-person view are two types of commonly used in game. Using first-person view can let player perceive the world same as avatar. Third-person view can be seen as an invisible camera is observing the game world. Basically the invisible camera located behind avatar.

**Consequence:** View of players can affect level design and game experience. Third-person view can bring more information, but make game less real; first-person view can let player feel immersive, but get less information from environment, which may due to increase difficulty. On the other hand, using third-person view designers have to consider rationality of
some actions while using first-person view don’t have to.

Using the pattern (in 3 cases):

![First-person view in Dishonored](image1)

**Figure 27:** First-person view in Dishonored

![Third-person view in Splinter Cell: Blacklist](image2)

**Figure 28:** Third-person view in Splinter Cell: Blacklist
In figure 27 we can see Dishonored using first-person view while Splinter Cell: Blacklist using third-person view in figure 28.

4.5 Analysis

In chapter 4.4 we identified 21 game design patterns that are relevant to stealth gameplay. Since there are more gameplays that are not relevant to stealth, we did not identify them as design patterns. On the other hand, since there are more branch missions (missions that not relevant to main game process, player can finish main part of a game without finishing all branch missions.), we cannot say that the collection is complete. In this chapter we analyse these design patterns.

<table>
<thead>
<tr>
<th>Existing</th>
<th>Created</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability and Equipment, Achievement, Background Story, Collection Factor, Difficulty Selection, Enemy Type, Hostage, Mark, Observation, Obstacle, Option, Sound, Statistics and Assessment, Trap, View of Player</td>
<td>Action Posture, Alert, Field of Vision, Light and Shadow, Neither Damage nor Moving Action, Patrol</td>
</tr>
</tbody>
</table>

Table 6: Existing and Created game design patterns

<table>
<thead>
<tr>
<th>Affect Game Experience</th>
<th>Affect Level Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability and Equipment, Achievement, Action posture, Alert, Background Story, Difficulty Selection, Field of Vision, Hostage, Light and Shadow, Mark, Neither Damage nor Moving Action, Observation, Option, Patrol, Sound, Statistics and Assessment, Trap, View of Player</td>
<td>Ability and Equipment, Achievement, Action posture, Alert, Collection Factor, Enemy Type, Field of Vision, Hostage, Light and Shadow, Neither Damage nor Moving Action, Obstacle, Option, Patrol, Sound, Trap, View of Player</td>
</tr>
</tbody>
</table>

Table 7: Game design patterns that affect game experience and level design
From Table 6 we can see there are 15 existing game design patterns but different in stealth games. There are 6 created stealth game design patterns. From table 7 we can see there are 18 game design patterns that can affect game experience in designing, while there are 16 game design patterns that can affect level design in designing.

4.6 Conclusion

We created a collection of stealth game design patterns. We found features that are relevant to stealth in each case, then compared similar features and summarize them to design patterns. These patterns should be considered in stealth game designing. We also found relationship between these game design patterns and level design, and these game design patterns and game experience.

The collection of game design patterns can answer RQ1 and two sub-questions.

RQ1: Which game design patterns should be considered to create stealth game?

Based on our case study we summarize 21 typical game design patterns in three stealth game. The 21 design patterns are only basic design patterns. With the growth of stealth games, the stealth game design patterns collection will be more and more abundant.

Sub-question 1. Which game design patterns should be considered to make a stealth game level?

Based on our case study we summarize 21 typical game design patterns in three famous stealth game. There are 16 types relevant to level design. If designers can consider the use of these 16 game design patterns while doing level design work for a stealth game, to some extent, the difficulty of the game can satisfy player’s expectations.

Sub-question 2. Which game design patterns should be considered to make a stealth game more realistic?

Based on our case study we summarize 21 typical game design patterns in three stealth game. There are 18 types relevant to game experience. If designers can consider the use of these 18 game design patterns while designing the basic concept of a stealth game, to some
extent, the game can make players feel real and get better game experience.

By using this collection, designers can:

• Check necessary design patterns in their own stealth games.
• Find or improve core gameplay of their game by reading ‘using the pattern’ part
• Find new way of using a pattern in order to make the gameplay different by checking existing ways of using the pattern.
• Communicating with other designers or peers easier.

On the other hand, the collection is also a theory basic for our design and creation part. We developed a prototype of an application that can help designers to create their own stealth games based on this collection.

We identified a stealth game design patterns from three famous stealth games, and at last we got such collection. Since there are more stealth games, we believe in the future more stealth game design patterns would be found and make the collection more abundant.
5 Questionnaire

5.1 Questionnaire Result

We chose participants by two ways:

1) Check staff list of stealth games, contact with designers and invite them to participate interviews. We contacted 5 designers, but only one responded.

2) Participate in game designers groups on Social Network Software (SNS), like Linkedin and Facebook, then ask questions to all designers in the groups. We did not get any feedback from Linkedin. We get 9 feedbacks from Facebook, and only three of them like to participate the chat interview. At last, we got four participants:

   Dishonored designer: Ricardo Bare
   Individual game developer: Jonathan Pasamonte
   Individual game developer: Rene Haefferer
   Lecturer in university: August Ray

Unfortunately, we did not get a lot of participants. From the process of questionnaire, some participants did not know the concept of game design pattern at all. Here we got an email questions from Ricardo Bare, can be seen in appendix I. We got three chat interviews from another three interviewees.

5.2 Conclusion

From the result of questionnaire, we knew that not all designers are familiar with the concept of game design pattern. In four participants, only the lecturer in university knew the concept. Since only Ricardo Bare give us clear answer about research questions, we use his answers to answer research questions.

   RQ1: Which game design patterns should be considered to create a stealth game?

   The thinking of ‘break rule’ and game system are also important elements in stealth game designing.

   Sub-question 1. Which game design patterns should be considered to make a stealth game
level?

The thinking of ‘break rule’ is important in getting higher quality level.

Sub-question 2. Which game design patterns should be considered to make a stealth game more realistic?

Game system about gameplay is another important element in creating realistic stealth game.

From questionnaire transcripts we can conclude:

- Not all designers are familiar with game design patterns. Some of them still consider game design patterns as a tool in programming but not in concept designing. Nevertheless, they still use single game design pattern in developing. Therefore learning more about game design patterns could give them more help.

- To expert designers, concept and core gameplay of a game is more important than prototype. On the other hand, to individual designers, prototyping is more important than concept. In spite of this, a game design patterns collection could be more helpful to expert designers. Even though, game design patterns collection can also make prototype better because it can help designers to get better concept.

- Game design patterns can gain quality of both level design and game experience. If one designer can use game design patterns in game designing better, one will get better system and enjoyment, which means get better level and game experience.

Based on the three conclusions, we can conclude one important requirement of the game design patterns application: game design patterns must be connecting with concept design step.
6 Design and Creation

There are two ways to show stealth game design patterns directly to designers: create a game including all design patterns, and create a website/application/book to show word version of design patterns. The knowledge and time of creating a game are beyond our ability, so we choose creating an application.

Even there are some websites provide game design patterns collections [17], it is still not convenient to check. There are two main reasons for this: first, websites provide game design patterns for all kinds of game, not only one type of game. Second, designers have to write design document too, it is a trouble to both write document and check game design patterns.

Nowadays tablet PC is commonly used in everyday work. Helpful applications can help people get higher efficiency in working. In this chapter we presented the implementations of an application prototype that can help designers in stealth game designing by checking game design patterns we created. We follow the creative process and design document given by Oxland [32]. Creative process is a game development process including 7 parts:

1) Shape idea
2) Create concept document
3) Create design document
4) Continue designing/prototype a section of the design followed by post-prototyping
5) Production/game balancing
6) Post-production/Test/Alpha, beta, completion
7) Walkthrough-manual/Retail

The APP should help designers improving the quality of shape idea part and create design document part in stealth game designing.

6.1 Design

6.1.1 Overview

We focused on Android system. We used APP inventor 2 to create the prototype.
This APP aim to let user check our stealth game design collections. We will provide two types of checking: checking by alphabet and checking by design document. We will add new functions in the future. For instance, add new game design patterns in original game design patterns collections, change design document template, change stealth game design patterns collection to other type of game design pattern collection.

6.1.2 Functional Requirements

From the interview we know that not all designers are familiar with game design patterns. There is a need of an application that can introduce game design patterns to designers. It is hard for us to create a game engine to introduce game design patterns, so we use an application with the stealth game design patterns collection based on case study result instead.

Designers also need to now how and where to use one game design pattern, thus there is another needs that the application must be relevant with creative process. We use design document template from Oxland [32], in order to connect game design patterns and each step in the design document.

Functional requirement 1: Show every stealth game patterns in detail.

Functional requirement 2: Show how and where to use these stealth game design pattern in stealth game design.

6.1.3 System Architecture

The APP consists of three parts: Main screen, Check by alphabet screen, and Check by design document screen. From main screen user can choose check by alphabet screen or check by design document screen.

In check by alphabet screen user can choose all game design patterns arrange in order and read detail of the chosen game design pattern.

In check by design document screen user can choose design process from a settled design document, then user can see and choose game design patterns relevant to chosen design process. At last user can read detail of the chosen game design pattern. In Figure 29 we can see the structure of the APP system.
6.1.4 Data Input

In this APP there are two kinds of data: stealth game design patterns collection and design document template. Here we have three steps to do:

- Input stealth game design patterns collection. As we said in chapter 4, our stealth game design patterns consist of four parts: Name, Description, Consequence and Using the patterns. Here we do not have to input examples in individual game.

- Input design document template. We can find different kinds of design document templates and concept document templates. Here we use a design document template from Oxland [32]. It consists of fifteen parts, and in this APP, we only use ten parts that relevant to game design patterns. In Table 8 we can see the design document template.
<table>
<thead>
<tr>
<th>General Overview</th>
<th>• Perspective. Is it single player, multi-player or both, the player’s role with in the gaming world and an overview of the challenges the player will encounter.</th>
</tr>
</thead>
</table>
| Player character/mechanics | • Initially describe the character the player will become from start to finish  
• What is the player’s motivation for playing?  
• Describe the mechanics of character growth both in appearance and functionality  
• Lives, hit points, health system.  
• Movement through all environment types such as land, water, air and any special movement features relevant to your game.  
• Administering actions and special items such as inventory objects the player will use for gameplay such as weapons, and all of the object’s mechanics and resources. |
| Graphical User Interface | • All front-end menus including title screen, options, save/load, inventory system, map function, HUD layout, game over screen, pause screen, etc. |
| User interface | • Controlling the player characters, activating and controlling weapons and items |
| Game Structure | • Progression, mission/challenge structure, implicit and explicit rules, puzzle structure, reward system, difficulty settings, saving/loading, pace, rhythm, victory conditions, chance element, all types of feedback, scope. |
| Missions/challenges in detail | • Using the rules and structure previously defined, we will need to describe every mission and challenge, documenting how the player will achieve the victory and failure conditions. |
| Feature set and mechanics | • All items and attachments and the feedback for those items |
| Game environments | • Size, environment structure, features, interaction, feedback, damage limitations, weather, time of day, day and night conditions, special environment cameras, special environment features, a word about collision, special lighting required for gameplay purposes, boundaries |
| Creatures and behaviour/AI | • Details of all NPC including class, structure, purpose in game, movement, special features, intelligence and behaviour, hit points, inventory, dispatching and re-spawning. |
| Sound | • Musical scores, sound effects, sound design and mechanics used in the gameplay. |

Table 8: Design Document Template from [32]
● Connect each design process with game design patterns. Here we connect 21 stealth game design patterns with 10 design process. In table 9 we can see in detail.

<table>
<thead>
<tr>
<th>General Overview</th>
<th>Background story, View of player</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player character/mechanics</td>
<td>Ability and Equipment, Action Posture, Background Story, Neither Damage nor Moving Action, Sound</td>
</tr>
<tr>
<td>Graphical User Interface</td>
<td>Achievement, Difficulty Selection, Statistics and Assessment</td>
</tr>
<tr>
<td>User interface</td>
<td>Ability and Equipment, Action Posture, Mark, Neither Damage nor Moving Action, Observation</td>
</tr>
<tr>
<td>Game Structure</td>
<td>Difficulty Selection, Statistics and Assessment</td>
</tr>
<tr>
<td>Missions/challenges in detail</td>
<td>Achievement, Collection Factor, Option, Statistics and Assessment</td>
</tr>
<tr>
<td>Feature set and mechanics</td>
<td>Ability and Equipment, Obstacle</td>
</tr>
<tr>
<td>Game environments</td>
<td>Alert, Collection Factor, Hostage, Light and Shadow, Obstacle, Sound, Trap</td>
</tr>
<tr>
<td>Creatures and behaviour/AI</td>
<td>Alert, Difficulty Selection, Enemy Type, Field of View, Hostage, Light and Shadow, Obstacle, Patrol, Sound</td>
</tr>
<tr>
<td>Sound</td>
<td>Alert, Sound</td>
</tr>
</tbody>
</table>

**Table 9**: Connection between game design patterns and design process

6.1.5 Interface Design

The interface of the APP consists of four parts:

● **Title.** User knows which screen they are watching.

● **Buttons.** User can choose the function/pattern/process they want.

● **List.** Show stealth game design pattern collection and/or design document processes.

● **Screen.** Show detail of every stealth game design pattern.

In Figure 30 we can see the paper prototype of interface.
6.2 Development

We use app inventor 2 to develop the prototype of the application. In this version we will fulfill two requirements: checking stealth game design patterns by alphabet and checking stealth game design patterns by settled design document template.

6.2.1 Design Part

The APP has three screens (see figure 31). The main screen has one title, two labels and three buttons. The label on the top is a brief introduction of the APP. The label in the bottom will show after user click ‘Add New Patterns’ button, in order to show that the APP do not have such function yet. Click ‘Check Patterns By Alphabet’ can go to alphabet screen, and click ‘Check Patterns By Design Document’ can go to design document screen.

Figure 30: Paper Prototype Interface
Figure 31: Main Screen  Figure 32: Alphabet Screen  Figure 33: List

In figure 32 and 33 we can see the alphabet screen. It consists of 3 parts: one title, one list and a group of labels. When the users click list, they can choose the patterns they want to see in list. Then the detail of chosen pattern will be shown on the labels. There are 6 labels in the group, 3 title labels and 3 content labels.
In figure 34, 35 and 36 we can see the design document screen. It consists of one title, ten shown buttons, ten group of hidden buttons, and one group of labels. When users click one design process button, the group of hidden buttons belong to the design process will be shown under the button. Then click one of the stealth game design pattern button, the detail of the pattern will be shown on the label group.

6.2.2 Block Part

Three screens have three block parts. From figure 37 we can see there are only three actions. By click the first two actions one can go to other screen, by clicking the last action, the text ”Add new patterns will be used in next version.” is shown on the screen.

![Diagram](image-url)

**Figure 37: Main Screen Block**
From figure 38 we can see there are 2 actions and some lists. Actually there are four lists, each one corresponding to one part of game design patterns. After user selecting a pattern, the content of each part of game design pattern will be shown on labels. There is another action for the screen, after the alphabet screen initialized, the list elements will be shown as first game design pattern.
From figure 39 we can see blocks from design document screen. There are three groups of actions and three lists. First group has only one action, which is used to let the labels invisible when the design document screen initialized. Second group has ten actions, which are used to let the hidden buttons show under each design process. Last group has forty actions, which are used to let detail of chosen pattern show on the labels. Here we do not need name part of a game design pattern, so we only need other three part of game design pattern.

6.3 Evaluation

Since to develop a game, especially a stealth game, will take a long time, we cannot evaluate the APP in real design process. Here we only collect 3 users’ feedback as information to evaluate the value of the APP. Unfortunately, there are not many users, therefore the survey results are in conclusive. The app received good feedback in general, all testers believed that the APP would be helpful in create design document part. Some testers thought the APP can help designers in shape idea part. All testers think it is a good APP for new designers. There are also some negative aspects.
Too many text make users have no patient to read. This means we have to do more work in UI design, and try to make the descriptions simpler.

The color of the APP is monotonous. Since it is only a prototype, it is not a big problem, but we still need to do more work in UI design to solve this problem.

Some users think it may not help much in stealth game designing, especially in shape idea part. We think that depends on how familiar the designer is with game design patterns, especially stealth game design patterns. In this area, every user believes that it can help designers familiar with stealth game design patterns.

We believe all these feedback would lead to developing a better version. In future we will tend to implement other functions mentioned in chapter 6.1

6.4 Conclusion

In research question part, the creation of APP can answer RQ2.

RQ2: How to help game designers in their creative process of developing a stealth game prototype?

From the development and evaluation of the APP, we know it is hard for us to create a game engine to help designers, while we develop an APP to help designer familiar with stealth game design patterns. The APP can help improving the quality of shape idea part and create design document part of creative process.

We designed and created an APP to help designers to familiar with stealth game design patterns and get some good feedback. Even though we can not make sure the APP can definitely improve the quality in stealth game design. We also test our ability of programming and design, and found that we could do better in UI design.
7 Conclusion

In this chapter, we discuss the results obtained in this thesis project and then conclude our work. We summarize the answers to our research questions, conclude our work including discuss limitations and contribution, then outline future work.

RQ1: Which game design patterns should be considered to create stealth game?

We used case study and questionnaire as methods. Using case study method tends to collect information from separate stealth game. From case study we knew 21 game design patterns from three games are important design patterns. The 21 design patterns are only basic design patterns. With the growth of stealth games, the stealth game design patterns collection will be more and more abundant.

On the other hand, using questionnaire method tends to collect data from experienced game designers. From questionnaire we knew the thinking of ‘break rule’ and game system are also important elements in stealth game designing. In conclusion, our result basically comes from case study.

Sub-question 1. Which game design patterns should be considered to make a stealth game level?

From case study we knew there are 16 types relevant to level design. If designers can consider the use of these 16 game design patterns while doing level design work for a stealth game, to some extent, the difficulty of the game can satisfy player’s expectations. From questionnaire we knew the thinking of ‘break rule’ is important in getting higher quality level.

Sub-question 2. Which game design patterns should be considered to make a stealth game more realistic?

From case study we knew there are 18 types relevant to game experience. If designers can consider the use of these 18 game design patterns while designing the basic concept of a stealth game, to some extent, the game can make players feel real and get better game experience. From questionnaire we knew game system about gameplay is another important
element in creating realistic stealth game.

RQ2: How to help game designers in their creative process of developing a stealth game prototype?

We used design and creation as methods. The basic data of design and creation, including collection of stealth game design patterns and needs of stealth game developer come from case study and questionnaire. From design and creation we knew it is hard for us to create a game engine to help designers, while we develop an APP to help designer familiar with stealth game design patterns. The APP can help improving the quality of shape idea part and create design document part of creative process.

7.1 Conclusions

We identified a stealth game design patterns from three famous stealth games. We used a template based on Björk and Holopainen but different from their template. We simplified the template to fulfill the needs of our thesis.

We collected answer of questionnaire from game designers especially stealth game designers, but the truth is compared with other types of game, stealth game is a small group, which means designers with relevant experience are less. Fortunately we found the designer of Dishonored, which is a game in our case study. We learn more about stealth game designing, level design and game experience from him. We also learned that game design pattern is not a popular tools to game designers.

We designed and created an APP to help designers to become familiar with stealth game design patterns and get some good feedback. The application focus on one single type of game: stealth game. However, we are not sure the APP can definitely improve the quality in stealth game design. We also test our ability of programming and design, and found that we could do better in UI design.

We also test our ability of programming and design, and found that we could do better in UI design.
7.2 Future Work

There are two important work in the future:

- Spread the knowledge of game design patterns. We want every designer know the relevant knowledge of it and can use it as a tool in game design.

- Collect more game design patterns about stealth game, and create new version of APP, make a better UI design.
Appendix I: Questionnaire

1.1 Questionnaire Questions

1. Could you tell me what you do in designing?

2. Do you know about design patterns?

3. What are the stages involved in creating a prototype of a game?

4. What makes a level design in stealth game a good design or a bad design?

5. What makes a game experience in stealth game a real experience or a fake experience?

6. What makes a prototype of a stealth game a good one or a bad one?

7. How do you feel design patterns using for level design in stealth game?

8. How do you feel design patterns using for game experience in stealth game?

9. How do you feel design patterns using for prototyping in stealth game?

10. Do you think design patterns can be helpful in level design? How can it help level design, especially in stealth game?

11. Do you think design patterns can be helpful in getting a more real game experience in stealth game? For example, reaction of enemies to noise, light, etc.

12. Do you think design patterns can be used in creating prototype of a stealth game? How do you think designers can use it?
1.2 Questionnaire Transcripts

1.2.1 Ricardo Bare

Some questions I left blank because I wasn’t sure what you meant by a designer pattern. If you clarify, I’ll be happy to answer the rest.

1. Could you tell me what you do in designing?

Currently I’m a lead designer at Arkane. Over my time here I’ve done various things: Creative direction (on the Dishonored DLC’s), level design (scripting, level layout, etc), game system design, writing, and lead tech.

2. Do you know about design patterns?

A little bit. I’m assuming you’re talking about design patterns as general solutions or approaches to programming. Or do you mean something else? I’m not a programmer though, so my knowledge of that kind of design pattern is pretty shallow.

3. What are the stages involved in creating a prototype of a game?

Not very many since it’s just a prototype. At Arkane, we tend to start with a loose spec or high level concept. We tend to not go too deep on the fiction, or even all the rules and mechanics until we get a rough version up and running and see if it holds any promise. Often, the prototype is just done in scripting, if the idea is simple enough (for instance, if using Unreal a level designer might mock it up with Kismet). If that’s not feasible then we’ll involve programming.

Once the prototype is up and running everyone plays with it and decides if it’s worth pursuing or not. We make adjustments, try new rules and so on until it’s something everyone thinks is fun. If approved, the art will and fiction behind it will then begin to mature.

The Arc Pylon’s in Dishonored started this way, for instance. It was a kismet prototype with just blocky art that worked essentially like the ship arc pylon does, but without all the cool art.

4. What makes a level design in stealth game a good design or a bad design?

That’s a big questions, but I’ll focus on one major element. As a general rule, a level needs to have “player owned” spaces and “enemy owned” spaces, and both need to be clearly readable to the player. So, in theif
for instance, the guards ‘own’ the well-lit areas they patrol and the player ‘owns’ the dark areas. Where a level designer places the lit vs dark areas and how the guards behave will determine the challenge in a particular level. By contrast, in Dishonored the rules center more around cover and elevation. High places belong to the player, low places belong to the guards. The reason it needs to be readable is so that the player can formulate a plan and exploit the rules of the system to succeed. Now the reason, I say “general rule” is because you can bend and break these rules to create interesting situations and surprise the player on occasion. (For instance, a zombie that can see in the dark, or a spell that makes the player invisible even in the light).

5. What makes a game experience in stealth game a real experience or a fake experience? Systems! Simulated game systems that have rules the player can learn and exploit. For instance, typically enemies in stealth games have analog awareness models--that is they actually ‘sense’ the player’s presence over time. They see the player (better or worse depending on cover or lighting conditions) or they hear the player. The enemies tend to have several states of awareness as well--unsuspecting (just going about business as usual), suspicious (AI think he heard something so is searching), busted (AI knows the player is there and is attacking, raising the alarm or whatever).
In a system where AI’s are actually listening to sound and reacting, the player is able to do things like throw a bottle, or shoot a distant wall to district enemies away from his location.
The opposite of this would be a scripted trigger in a doorway that causes all the AI’s in a level to automatically know where the player is when he enters the doorway.

6. What makes a prototype of a stealth game a good one or a bad one?
The same as #5

7. How do you feel design patterns using for level design in stealth game?
I’m afraid this is where I can’t be as helpful, since I’m not sure what you mean by a design pattern.

8. How do you feel design patterns using for game experience in stealth game?

9. How do you feel design patterns using for prototyping in stealth game?
10. Do you think design patterns can be helpful in level design? How can it help level design, especially in stealth game?

11. Do you think design patterns can be helpful in getting a more real game experience in stealth game? For example, reaction of enemies to noise, light, etc.

Maybe you’re calling gameplay systems design patterns? If you’re talking about what I described in question #5, then yes. These types of systems are fundamental to a good stealth experience, I believe. But we call these “analog awareness” or “perception model” which is basically a system that governs how enemies receive sensory information about the environment and/or the player. It’s simulated instead of scripted.

12. Do you think design patterns can be used in creating prototype of a stealth game? How do you think designers can use it?
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