Chapter 1 - Literature Review

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1.1 Game Design
Before the project starts, existing knowledge on game design should be researched. A game will be designed, made and released into the market for this project. In order to increase chances of success, the principles of game design will be examined, and taken into account during the design process of the game.

First lets define what is a game? French sociologist Roger Caillois, defined a game as an activity that must have the following characteristics:
- Free: something which the player is not forced to engage in, in which event play will immediately lose the characteristic of an attractive and happy diversion.
- Isolated: circumscribed within the limitations of a precise time and place and agreed upon in advance.
- Uncertain: whose progress and result cannot be determined in advance, a certain latitude in the necessity of improvising being inevitably left to the initiative of the players.
- Unproductive: creating neither commodities, wealth, nor any kind of new element and, with the exception of a transfer of property among the circle of players, ending in a situation identical with that which prevailed when the game began.
- Unregulated: subject to the conventions that suspend ordinary laws and temporarily institute new rules that alone count.
- Fictitious: accompanied by a specific awareness of a second reality or of a frank unreality in contrast to daily life.
(Caillois 1957).
Ludwig Wittgenstein concluded, during his Philosophical Investigations works, that people apply the term game to a range of different human activities, that have to one another only what could be called family resemblances (Wittgenstein 1953/2002). These are two definitions are well known, and even today, despite their age still fit.

When talking about games and design, two things should be taken into account. Ludology and Narratology. There is a debate about Ludology vs Narratology in games. The narratological stance is that games should be understood as novel forms of narrative and can thus be studied using theories of narrative (Murray, 1997; Atkins, 2003). The ludological position is that games should be understood on their own terms. Ludologists have proposed that the study of games should concern the analysis of the abstract and formal systems they describe. In other words, the focus of game studies should be on the rules of a game, not on the representational elements which are only incidental (Aarseth, 2001; Eskelinen, 2001; Eskelinen, 2004). There is an interesting quote on this subject, that may now be a little outdated. “Interactivity is almost the opposite of narrative; narrative flows under the direction of the author, while interactivity depends on the player for motive power.” -Ernest Adams (1999).

Frasca, accredited as being one of the people to start the debate, defended himself and the idea of Ludology verses Narratology, in a later paper for the DiGRA. He stated his thoughts that there was a great misunderstanding, that Ludologists completely discard Narrative (Frasca 2003). He quotes Aarseth in this paper as saying - “[…] to claim that there is no difference between games and narratives is to ignore essential qualities of both categories. And yet, as this study tries to show, the difference is not clear-cut, and there is significant overlap between the two.” (Aarseth 1997). This presents the view, that it is not as simple as just Narratology or Ludology, that there is more to it than that, and that they often overlap.

“Another important element is a belief that creators are artists. At the same time, however, it’s necessary for us creators to be engineers, because of the skill required for the creations.” (Miyamoto 2000). There is a view of game designers as artists, and game design as an artistic process. However it is also true that designers must be engineers to be able to design something that can work and run. It is important to remember and keep in mind when designing, that it is both an artistic and technical process (Crawford 1997). Adams and Rollings (2003) talk about the importance of understanding your audience. They also suggest games are often made under the assumption that all players enjoy the same things as the designer and that this is dangerous, and when designing a game you should think of the audience not yourself. They also state the difference between a casual player and a core gamer. Core gamers “Play for the exhilaration of
defeating the game. They tolerate frustration well because of the charge they get out of finally winning. The greater the obstacle, the greater the sense of achievement. [...] They don't like games that are easy; they like games that are challenging”. “By comparison, casual gamers play for the sheer enjoyment of playing the game. If the game stops being enjoyable or becomes frustrating, the casual gamer will stop playing.”. That is Adams and Rollings (2003) view on Casual gamers and Core gamers. For this project the casual gamers will be the main target rather than the core gamers so this view, and definition of of the two will be useful, when considering the design of the game.

1.2 Brief Overview of the History of Mobile Phones
In 1946 the world was introduced to the first worldwide mobile network. It was introduced by the USA and could only be used nationally at the time, and used mostly for military purposes. In the latter part of the 1950s, mobile networks replaced the Analog network. Then, in 1973, Motorola were the pioneers presenting a prototype of the world’s first mobile telephone. It was one foot long, and weighed almost 2 pounds, and came in with a high price tag of $3995. This mobile phone became commercially available in 1983, providing one hour of talk time, and allowing you to store thirty phone numbers.

In one year, 300,000 people worldwide were owners, considering the high price, it was a big achievement and significant market growth. In 1982 the Finnish handset maker Nokia introduced its first Mobile phone, “Mobira Senator”. It looked like a portable radio, and weighed 21 pounds. Bell South/IBM were the first to produce a mobile phone with PDA features. It had a calculator, calendar applications, and also fax and e-mail capabilities. It weighed 18 pounds and sold for $900. Motorlola's “StarTac” was 3.1 pounds, which is lighter than some of the mobile phones available today, and it was both fashionable and functional. In 2000 Kyocera introduced QCP6035, the first widely available Palm OS based phone. 2002 saw the introduction of the “Danger Hiptop" which was later known as the T-Mobile Sidekick. It was one of the first mobiles to include a web browser, reliable e-mail access and instant messaging. In 2004 the RAZR v3 was introduced, Motorola started a trend towards ultra thin and stylish phones. Then in 2007, Apple introduced the innovative iPhone with its innovative touch screen.

(Speckmann 2008)
1.3 Android Platform

1.3.1 Android Information and Background

"Android is the first open source mobile application platform that has the potential to make significant inroads in many markets.” (Ableson et al 2009). Android is a software platform, and operating system for mobile devices. Android was based on the Linux kernel and was developed by Google/ the Open Handset Alliance. The Open Handset Alliance is comprised of various corporations and companies. Members include, Google, HTC, LG, Samsung, T-Mobile, Vodafone, Nvidia, Dell, Intel, Ebay, Garmin, Accenture and much more. A mix of mobile operators, handset manufactures, semi-conductor companies, software companies, and commercialization companies. (Feinbube 2011, Open Handset Alliance 2012).

Google wanted to enter the mobile phone market mostly to sell more ads in this new area. They acquired in July 2005 Android Inc., appointing Andy Rubin as their Director of Mobile Platforms group. Google then entered the mobile market, not as a new handset manufacturer but instead by introducing a new Operating System(OS), called “Android” on November 5th, 2007. Google wanted the OS to run on any device, whether they were HTC, Samsung or Motorola. With this vision and the vision of having Android based devices being able to do all a pc could do, they launched the Open Handset Alliance, to help make it possible.(Gadhavi and Shah 2010).
1.3.2 Technical Details of Android

"Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.". Android features, an application framework, Dalvik virtual machine, integrated browser, optimized graphics, SQLite, Media support, GSM Telephony, Bluetooth, EDGE, 3G, Wifi, Camera, GPS, compass, accelerometer, rich development environment. Bluetooth, EDGE, 3G, Wifi, GSM Telephony, Camera, GPS, compass, and accelerometer are all hardware dependant. Below is a diagram showing the major components of the Android operating system. (Android Developers 2012)

![Android OS Architecture](Image)

Figure 2 – Android OS Architecture. Source : Android Developers (2012).

Figure 2 shows the Architecture of the Android OS, and its major components. There are more details about the different components below retrieved from the Android Developers Website.
Linux Kernel.

Android uses, and relies upon the Linux version 2.6 for core system services, such as security, memory management, process management, network stack and driver model. The kernel also acts as an abstraction layer between the hardware and the rest of the software stack. The Kernel has been accredited with being one of the things that sets Android apart, with its functionality and stability.

Android Runtime.

Android comes ready with a set of core libraries that provide most of the functionality available in the core libraries of the Java programming language. The Dalvik Virtual Machine has been optimized for mobile devices. Every application runs in its own process, with its own instance of the Dalvik virtual machine. The format the Dalvik VM uses is the Dalvik Executable (.dex) format. This format is optimized for minimal memory footprint. The VM is register-based, and runs classes compiled by a Java language compiler that have been transformed into the .dex format by the included “dx” tool. The Dalvik VM relies on the Linux kernel for underlying functionality such as threading and low-level memory management.

Libraries

Android includes a set of C/C++ libraries used by various components of the Android system. These capabilities are exposed to developers through the Android application framework. Some of the core libraries are listed below:

- **System C library** - a BSD-derived implementation of the standard C system library (libc), tuned for embedded Linux-based devices

- **Media Libraries** - based on PacketVideo's OpenCORE; the libraries support playback and recording of many popular audio and video formats, as well as static image files, including MPEG4, H.264, MP3, AAC, AMR, JPG, and PNG

- **Surface Manager** - manages access to the display subsystem and seamlessly composites 2D and 3D graphic layers from multiple applications

- **LibWebCore** - a modern web browser engine which powers both the Android browser and an
embeddable web view

- SGL - the underlying 2D graphics engine
- 3D libraries - an implementation based on OpenGL ES 1.0 APIs; the libraries use either hardware
  3D acceleration (where available) or the included, highly optimized 3D software rasterizer
- FreeType - bitmap and vector font rendering
- SQLite - a powerful and lightweight relational database engine available to all applications

Application Framework

By providing an open development platform, Android offers developers the ability to build extremely rich and innovative applications. Developers are free to take advantage of the device hardware, access location information, run background services, set alarms, add notifications to the status bar, and much, much more.

Developers have full access to the same framework APIs used by the core applications. The application architecture is designed to simplify the reuse of components; any application can publish its capabilities and any other application may then make use of those capabilities (subject to security constraints enforced by the framework). This same mechanism allows components to be replaced by the user.

Underlying all applications is a set of services and systems, including:

- A rich and extensible set of Views that can be used to build an application, including lists, grids, text boxes, buttons, and even an embeddable web browser
- Content Providers that enable applications to access data from other applications (such as Contacts), or to share their own data
- A Resource Manager, providing access to non-code resources such as localized strings, graphics, and layout files
- A Notification Manager that enables all applications to display custom alerts in the status bar
- An Activity Manager that manages the lifecycle of applications and provides a common navigation backstack
Applications

Android will ship with a set of core applications including an email client, SMS program, calendar, maps, browser, contacts, and others. All applications are written using the Java programming language.

(Android Developers 2012, Web Designers Directory 2011)

1.3.3 Why Android and not Apple?

Android has had success over Apple. In the first quarter of 2010 for example. In the USA, Android overtook apple and took the number two spot, just below RIM (NPD 2010). Android is an open source development environment, free to use, and free to develop for. There are more than 200 million activated Android devices, in more than 130 countries and regions. Application downloads, and Android activations are up now activating more than 550,000 new devices each day worldwide. (Android 2012).

Figure 3. Growth in Downloads. Source : Android (2012).

Figure 4. Growth in Activations. Source : Android (2012).
Gartner, a leading information technology research and advisory company, stated that the Android OS rose to account for more than 50 percent of Smartphone Sales. In the third quarter of 2011, Android OS was 52.5% of smartphone sales, more than doubling its market share from the third quarter of the previous year. It beat some of its biggest competitors such as Windows 7 phones, RIM and Apple for the spot. (Gartner 2011). See the table below for a table of the statistics released by Gartner.

**Table 2**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>3Q11 Units</th>
<th>3Q11 Market Share (%)</th>
<th>3Q10 Units</th>
<th>3Q10 Market Share (%)</th>
</tr>
</thead>
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<td>60,490.4</td>
<td>52.5</td>
<td>20,544.0</td>
<td>25.3</td>
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<td>19,500.1</td>
<td>16.9</td>
<td>29,480.1</td>
<td>36.3</td>
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<td>iOS</td>
<td>17,295.3</td>
<td>15.0</td>
<td>13,484.4</td>
<td>16.6</td>
</tr>
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<td>Research In Motion</td>
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<td>12,508.3</td>
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<td>2.2</td>
<td>920.6</td>
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</tr>
<tr>
<td>Microsoft</td>
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<td>2.7</td>
</tr>
<tr>
<td>Others</td>
<td>1,018.1</td>
<td>0.9</td>
<td>1,991.3</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>100</strong></td>
<td><strong>81,132.6</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Figure 5 - Source: Gartner (November 2011)

Developing applications for iOS (Apple's Mobile operating system), must be done so on an Apple machine. Quoted from their website you need an - “Intel-based Mac running MacOS X Snow Leopard or later to develop iOS apps for the AppStore”. Additional to the costs of getting the equipment required to develop applications for the Apple AppStore, there is another fee.
To be an iOS developer you must pay an annual fee of $99 to create free applications, or $299 to create applications to sell. (Apple Developer 2012). Additional to all this, once you have paid the fees, got the equipment and made the application you then have to submit it to apple and face possible rejection of your application if it does not fit within the guidelines. (Apple Developer 2012).

Taking this into account, along with Android's growing success, and much cheaper development costs with them with just a $25 one off fee to become an Android developer, Android will be the platform for the game.

1.3.4 Using Adobe Air for Android

"Building engaging experiences for stand-alone applications is much harder than it should be. With Adobe AIR, we give developers and designers a tool to turn their ideas into applications quickly and easily. As new mobile platforms emerged, we have extended the reach of our customers by bringing AIR to those platforms." (Gourdol 2011- Cited by Brossier 2011). Air is available for developing applications for Android. It uses Action Script 3 as its programming language. As the quote says, AIR is a tool to turn ideas into applications quickly and easily. Adobe AIR, will be what will be used to create the game for this project.
References


Figure 1 – Taken from Speckmann (2008) paper - http://www.emich.edu/compsci/projects/Master_Thesis_Benjamin_Speckmann.pdf

Figure 2 – Retrieved from the Android Developers Website. - http://developer.android.com/guide/basics/what-is-android.html

Figure 3 – Retrieved from the Android Website - http://www.android.com/developers/

Figure 4 - Retrieved from the Android Website - http://www.android.com/developers/

Figure 5 - Retreived from Gartner Website - http://www.gartner.com/it/page.jsp?id=1848514