

# Final Report

Groep 6 Escape

21 January 2015



## 1 The team



Figure 1: Group 6 Escape. From left to right Arnoud Jonkers, Tim de Boer, Mike Koch, Jordi Hessels & Xander de Ronde

### **Game Designer**

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### **Lead Programmer**

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### **Lead Artist**

Jordi Hessels, 4155343 , Industrial Design Engineering, IO, J.F.B.Hessels@student.tudelft.nl

### **World Builder**

Arnoud Jonkers, 4170431 , Mechanical Engineering, 3ME, A.Y.A.Jonker@student.tudelft.nl

### **Producer**

Mike Koch, 4232313 , Aerospace Engineering, AE, M.R.Koch@student.tudelft.nl

## 2 Introduction

After nine weeks of hard work, the Escape game is ready to be released. Many hours have been put in the creation of models, gameplay & programming to come to this point.

Initially, the idea of creating a stealth game was brought up by one of our members. Now, as the game is finished, we think that Escape is a great addition to all other stealth games. People who like this genre of games, would also enjoy Escape.

Group 6: Escape would like to thank their teaching assistant Tom Viering for his instruction and guidance. Furthermore we would like to thank our project manager R. Bidarra for the challenging game design project and his instructions to help us out.

## 3 Platform & Controls

During an early brainstorming session, it was decided to give the gamer the feeling that they feel like they really are walking around in the game. The best way to achieve this is to render the game in a first person view. This gives the gamer a realistic and emerging playing experience. It gives the player the classic experience of looking around to see if there are any enemies nearby.

The game is played using the controls listed in table 1.

Control:	Action:
Left Arrow / A	Player moves to the left
Right Arrow / S	Player moves to the right
Arrow up / W	Player moves to the front
Arrow down / D	Player moves back
Escape	Open ingame menu
Spacebar	Interact with objects in the environment
Tab	Open the inventory
Mouse movement	Control the player camera
Left mouse button	Use an equipped (consumable) item

Table 1: Controls in the game

## 4 Story & Setting of the game

It's the year 2116. The alien community on the planet Aleya is running out of power. These aliens traversed the entire Milky Way to find a suitable, abundant power source. On planet Earth they found humans as their long sought-after power supply. First contact was made around the 1950's, but any contact has since been denied by government officials. The aliens abducted a sufficient amount of healthy humans, which could deliver enough power to supply entire planet of Aleya. Then they built a high-security prison below the earth surface, near Roswell, New Mexico, and stored all of the abducted humans they caught in cryogenic cells in this prison. These cells are used by the aliens to extract power from humans. The extracted power will be transported to Aleya. The humans are desperate to escape, but there has been no opportunities to do so.

The game starts with the player standing in a cryogenic cell, located in the previously mentioned high-security prison. Due to a power failure, the player awakes and is able to open their cryogenic cell. This is likely the only chance the player will ever get to escape from the prison and get back to the surface to at least try to live a normal life again. The player will have to get out of the prison while staying undetected for as long as possible,

as being detected by the alien guards could lead to being captured again. Meanwhile, the player will be moving through a web of rooms and floors, solving game puzzles at times when they see fit.

## 5 Technical Components

### 5.1 Each component

All components in Escape are listed below.

#### Computer Graphics(20/12 stars):

- Procedural generated meshes (\*\*) The meshes and the textures of the floors in the game are generated. The worldbuilder can define the x by y size of the floor and the tiles that are used as texture. - Arnoud
- 3D-models (\*) All 3D models in the game are self-made. - Jordi, Mike & Xander
- Animated 3D-models (\*\*\*) All animations used in the game are home-made with Unity or Blender. - Mike, Jordi
- Procedurally generated textures (\*\*\*\*) By generating textures through algorithms, repetitive looking textures can be prevented. This will be challenging to pull off in a way where the texture quality itself isn't sacrificed all too much. - Arnoud
- Animated Textures (\*\*) The TV screen shows the story of the game. The screen changes to show the complete story. - Mike
- Sound effects (\*) - Tim
- Particle Systems (\*) - Xander
- Play with lights and shadows (\*\*) Lights can be turned on and off with a switch. - Jordi
- Start, pause, end screen (\*) - Xander, Jordi
- High scores (\*) When the player opens a door or collects an item, the score of the player increases. - Mike
- Options (\*) The options menu contains elements like adjusting volume and sound, but also advanced graphical options like Anti-Aliasing or resolution. - Xander
- Credits (\*) Completing the game leads to a screen where the group members will be credited for their contributions. - Xander

#### Artificial Intelligence(8/8 stars):

- Pathfinding using NavMesh (\*\*) The NavMesh pathfinding algorithm is used to make enemies search for the player or patrol around an area. By using this, guards will surely feel much more lively, when encountered. - Arnoud
- Different states of consciousness in enemies (\*\*\* ) - Arnoud
- An enemy that learns which path has the biggest chance to find a player using own algorithm (\*\*\* ) - Arnoud

#### Web & Databases(15/8 stars):

- Collect playthrough data (\*\*) - Tim
- Store data on web server (\*\*) - Tim
- Visualize data on webserver (\*\*) - Tim
- Collect and show highscores from web server (\*\*) - Tim

- Online gamer accounts with avatars (\*\*\*) - Tim
- Mobile device as second screen (\*\*\*\*) A mobile device can be used to show the current inventory, i.e. the items currently in the player's posession, and to give explanation about the objects in your inventory. These pieces of information would also be available in-game, but using a second screen could prove to be a nice feature for some players. This feature would only extend upon features that are already in place, so it could be partially 'recycled' - Tim

#### **Programming(10/10 stars):**

- Procedurally generated positioning of game content (\*\*\* ) Keycards will be placed randomly in the game & the startposition of the first person controller will be in one of the six cryogenic cells. Which cryogenic cell will be determined randomly. - Mike
- Race against clock (\*) When the door to the elevator has been unlocked in level 1, the player has 15 seconds to escape to the second floor. - Mike
- FPS independent (use Time.deltaTime) (\*\*) The game time will be fps independent, so the game doesn't behave differently based on a machine's performance. - Xander, Jordi, Arnoud, Tim & Mike
- Unity's triggers only for collision checks (\*) - Xander, Jordi, Arnoud, Tim & Mike
- Use Unity's full physics simulation for all movement, collisions etc (\*) - Xander, Jordi, Arnoud, Tim & Mike
- Opportunity to collect items and use them in different ways (\*\*) Keycards, flashlight, etc can be collected and used in the game. - Tim

## **5.2 Unexpected Problems**

During every game design process, unexpected problems submerge. This section discusses the most important problems that were faced during the development of Escape.

The biggest problem during the design of game Escape was the use of GitHub. Around 300 gitignores were created, but they didn't seem to work. GitHub synced all files, which was very annoying and time-consuming. More and more time was spent to fix this problem. Finally, half-way through the project, the problem was found. All files were already synced with GitHub before the gitignores were declared. After removing these files from GitHub and adding the gitignores again, the problem was solved.

The second big problem, was performance issues. A longstanding bug was encountered within Unity which causes dedicated graphics drivers (Nvidia/AMD) to fail synchronizing frames to the screen's refresh rate. Turning off Vertical Sync does not cause this bug to disappear, as Unity will still try to wait for Vertical Sync. This causes a lot of processing power to be used to wait for a certain frame, even though it isn't supposed to. This caused the game to perform better on Intel HD graphics than it would using the dedicated graphics card, on some machines. Switching the used screen by the game would also yield different results, event though the screens have similar specifications.

## **6 Code Quality**

A lot of programming was involved in shaping up Escape to the way it is now. The quality of the code was a very important aspect in getting to this point. This section will explain more about how the development team has dealt with this.

Making the code as readable and clean as possible was one of the core things kept in mind while developing the game. When a new piece of code was added to a script, a new function in that code was created. The code has been built up in a modular way, which made progress slow at first, but particularly faster after the setup was

complete. Furthermore, usage of self-explanatory names for variables was also enforced.

Most of the time, the members were working on their own piece code. At a point the script ColliderController became the main script of the game, as it contained most of the information about objects and interaction with objects in the game environment. So as multiple people had to add things to this script, only one person worked on this script at a time. When they finished their work on it, a different member could start working on it. Sometimes two people were working in ColliderController, in that case one of them had to backup his script, retrieve the newer version of the script and then copy and paste their parts in it.

## 7 Art

Art is also an important aspect of game design, as it creates the atmosphere of the game. This will be discussed in the following section.

In the beginning, during the brainstorm session, some pieces of concept art were made. Those represented our idea of the game and gave us a visual representation of what the group wanted the game to be like. These concept arts can be found in figures 2, 3, 4, 5 and 6. The concept arts are made by our Lead Artist.

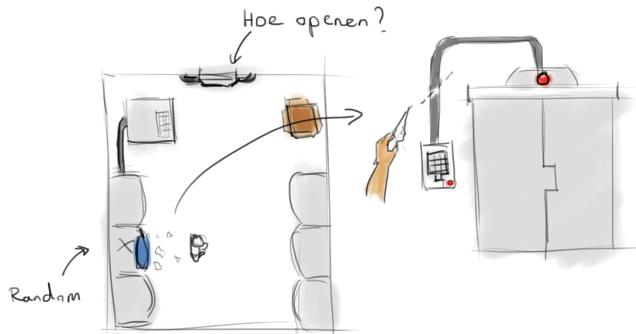


Figure 2: This concept represents the idea of the first level.

All models are made by the Producer, the Lead Artist and the Game Designer. A list of all models and who made them can be found in table 2. The textures are made by the Producer and the Lead Artist.

Some screen-shots of the game can be found in figures 7, 8, 9 and 10.

## 8 Process

The process of making this game went very smoothly. The instructors heavily encouraged using the SCRUM-method during the development of the game. Group Escape did follow that approach for the most part. Every Tuesday morning there was an appointment with our Teacher's Assistant. During those appointments, it was discussed which things had priority and which didn't require immediate attention. After these appointments the tasks were divided. When a team member finished a task he continued with the next task, or tried to help out others with their tasks. An online to-do list was created, where everyone could add or finish to-dos.

One of the first things during the project was dividing the roles. This was not taken into account during to-do divisions. Generally it was discussed who would do what task, but as it turned out, not much discussion was necessary as nobody really minded doing any specific task at all. Knowing each others' strengths and weaknesses was also a big contributing factor to the smooth collaboration.

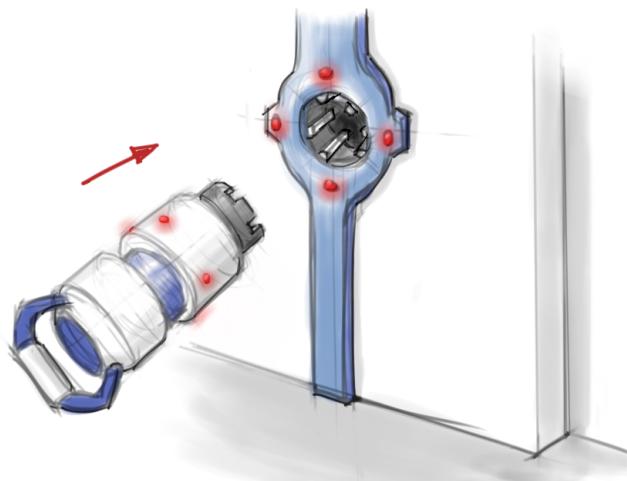


Figure 3: This concept represents the idea of the key which opens doors.



Figure 4: This concept represents the idea to move to the next level via stairs, later it was decided to use a lift.



Figure 5: This concept represents the idea of the drone.

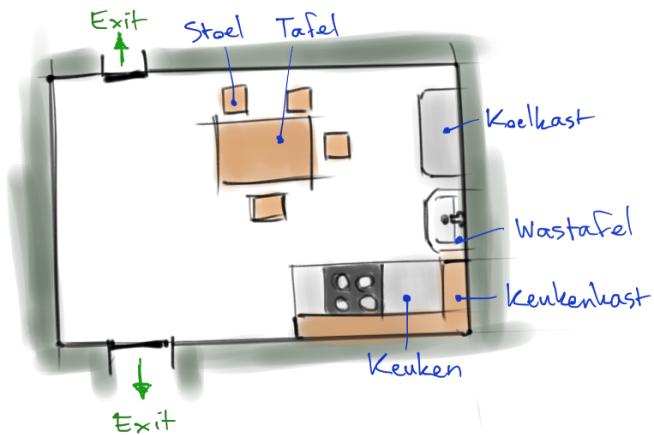


Figure 6: This concept represents the idea of a dining room.

<b>Model:</b>	<b>Creator:</b>	<b>Model:</b>	<b>Creator:</b>	<b>Model:</b>	<b>Creator:</b>
Achterdeur	Jordi	Alien guard	Jordi	bowl	Jordi
Ceiling Lamp	Jordi	Computerscherm	Jordi	Dining Tafel	Jordi
Drone	Jordi	Generator	Jordi	Menu Button	Jordi
PC Keyboard	Jordi	PC monitor	Jordi	Map	Jordi
Elevator	Jordi	GlassTank	Jordi	Info Sign	Jordi
Player Character	Jordi	Rekje (lab)	Jordi	Robot Guard	Jordi
Robot Guard 2	Jordi	Science Table	Jordi	Simple Door	Jordi
Staple Bed	Jordi	ESCAPE	Jordi	TV	Jordi
Cannon	Jordi	Afzuigkap	Xander	Camera	Xander
Couch	Xander	Device	Xander	Erlenmeyer	Xander
Jar	Xander	Keycard	Xander	KeycardLock	Xander
Kitchen Block	Xander	Pilaar	Xander	Night Stand	Xander
Schakelaar	Xander	Simpele Kleine Tafel	Xander	Simpele Stoel	Xander
Storage Rack	Xander	Test tafel	Xander	Deur	Mike
Cryogenic Cell	Mike	Dining Table	Mike	Bureau	Mike
Bank	Mike	Bed	Mike	Serving Table	Mike
Closet	Mike	Cubicle	Mike	Locker	Mike
Kast met Rolluik	Mike	Laptop	Mike		
Meal	Mike				

Table 2: All models which were made for game Escape

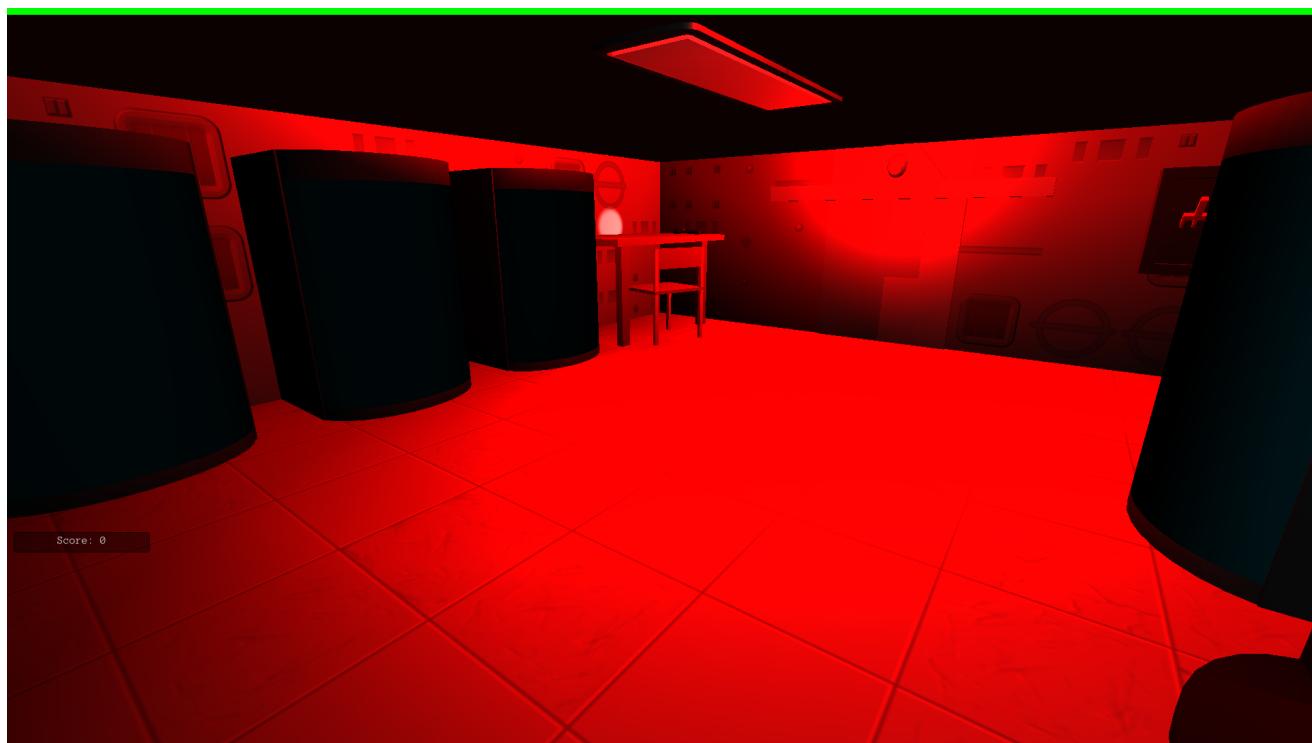


Figure 7: The room where the game starts.

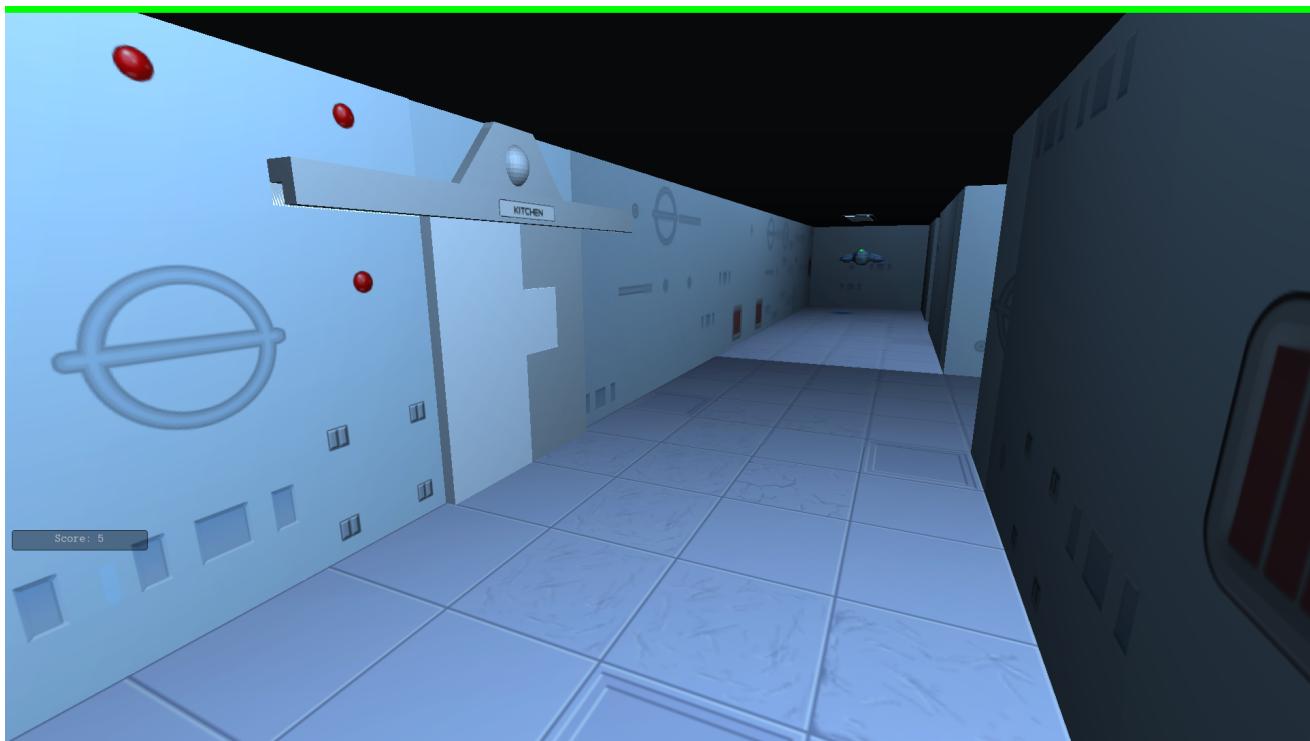


Figure 8: The hallway of the first level.



Figure 9: The kitchen in the second level.



Figure 10: The lab in the second level.

## 9 Conclusion

The game development of Escape has come to an end. In the end, it can be said that the game mostly fulfils the expectations of the group members. Still, one of the group members had expected more levels in the beginning and another one expected more gameplay. In the end, there was not enough time to implement these features in the game.

During the entire development cycle there was a nice atmosphere in the group. Everyone has his own qualities and everyone could assist each other. Everyone had his own job and executed it in a satisfactory manner.

For a possible next time, it would be better to make a more specific planning. So, to set more deadlines and to know exactly what should be done at a time. Now everybody knew what they should be doing, but deadlines weren't always set, as it was still a new experience for every member of the group and it was pretty hard to predict how long certain things would last. Overall, we consider the project to be a succes. It has been a great learning experience.