



Project Report  
Advanced Game Design  
[February-March 2024]

# Penguin Jump

SRH Hochschule Heidelberg  
Faculty for Information, Media & Design  
Degree: M.Sc. Applied Computer Science

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# **1. Planning**

## **1.1 Week 1**

### **1.1.1 The Elevator Pitch**

We were asked to decide on 4 to 5 games that can be developed as a prototype within the course of this block. The task was to pitch these games to the professor who would then select 2 games to be prototyped. Out of the games that were pitched, 2 games that were selected were the Penguin Jump and the Space Invasion.

### **1.1.2 The Task Division**

For the 2 games that were shortlisted, the group was divided into 2 teams. Each team had 3 members where 1 was responsible for documentation, 1 was responsible for graphic design and the other was responsible for coding. Cris Kohn was assigned as the manager for both the teams.

## **1.2 Week 2**

### **1.2.1 The Game Behavior**

The main discussion was to discuss regarding what type of game will we be creating, is it a vertical scroller or a horizontal scroller, whether is it a game with multiple lives or a game with single life and so on. After a brief discussion, the conclusion was to create a vertical scroller endless game with 1 single life. If the player dies, the game restarts.

### **1.2.2 The Game Cast**

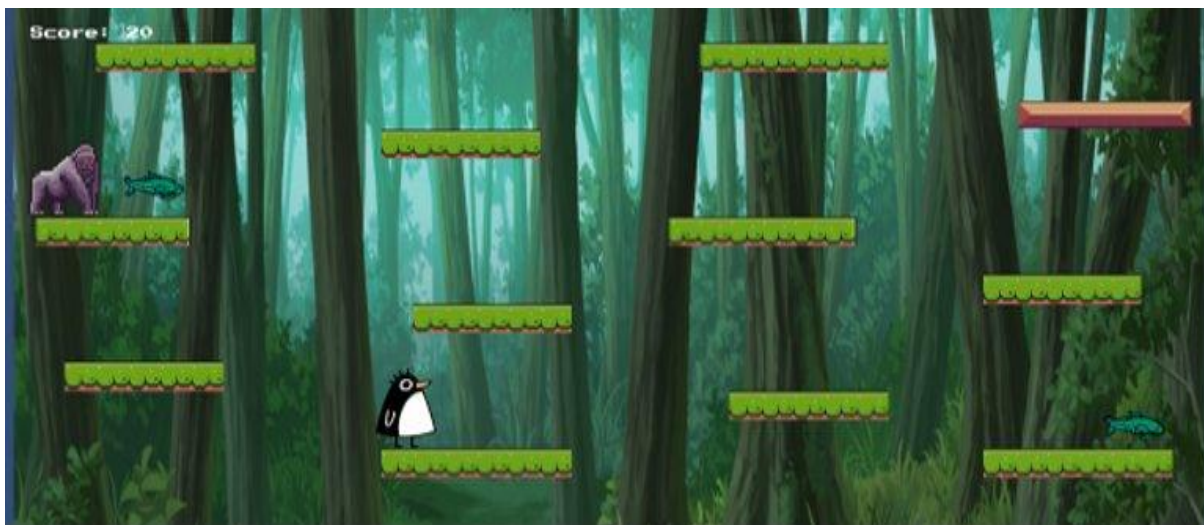
The next step was to decide on the different characters to be used to in the game. As our story revolves around a Penguin who escapes a zoo to reach its home, it would be our lead character. Next for the enemies, we decided to go with a wolf and a bear. We identified 2 types of platforms for the Penguin to jump on. One would be the normal platforms which might be simple or might have enemies or powers over them and the other one would be the platforms that will disappear after a certain time. For obstacles, we decided to go with different sizes of stones that would be falling randomly from above to increase the difficulty. For the power-ups

we decided to go with 3 powers. A shield that would protect the Penguin from all enemies and obstacles, a fish, by collecting which the score will increase by 10 points and a rocket on landing of which, the penguin can take a big jump. After the discussion the team worked on searching for the assets to be used in the game. The links to the assets are placed below in the references section.

## 2. The Game

### 2.1 Vision Statement

Penguin Jump is a game where the player controls a Penguin. The goal is to jump as high as possible on a series of platforms. The platforms vary in size and move horizontally. It creates a challenging environment as the difficulty increases as the player progresses in the game. The player must avoid obstacles and enemies while collecting power-ups to score points or protect themselves from enemies and obstacles.



### 2.2 Game Mechanics

#### 2.2.1 Player Character

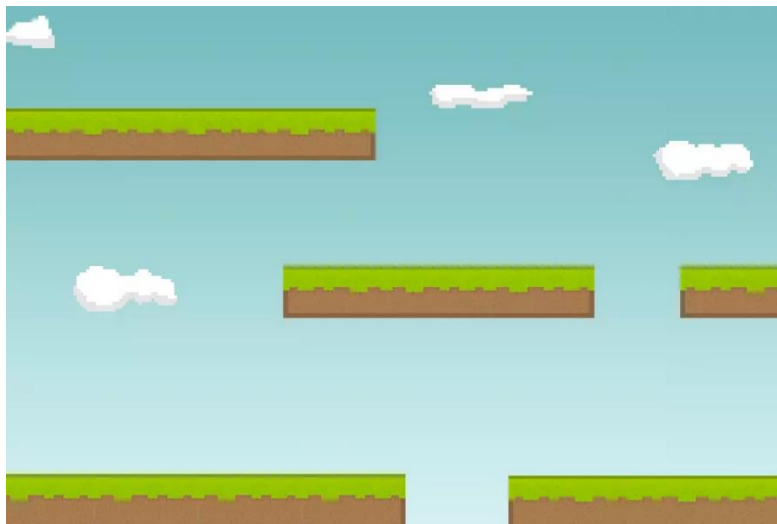
The player in the game would be a Penguin who has escaped from the zoo and is on a run to reach its original home. The road to reach the destination for the penguin would not be easy due to multiple obstacles and traps on its way.



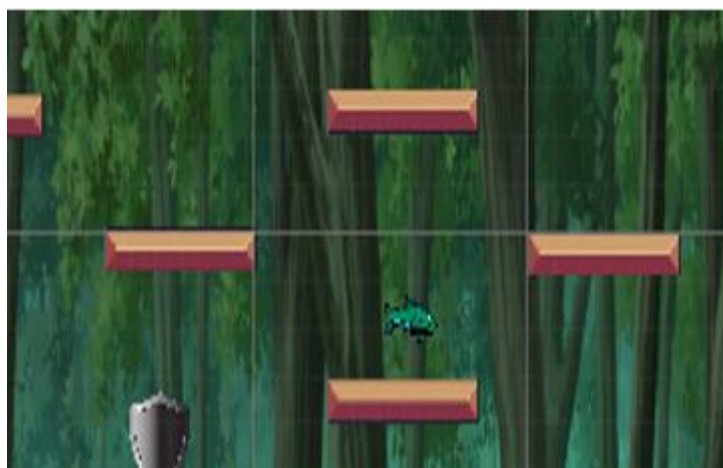
### 2.2.2 Platforms

The game will have 3 types of platform base:

- **Wooden base:** This will be the platform base when the Penguin exits the zoo to reach its home. Figure below shows the platform design to be used during that phase:



- **Stone base:** This platform base will be used for increasing the difficulty of the game. These will be disappearing platforms. The figure below shows the platform design to be used during that phase:



- **Ice base:** This platform base will be used during the last phase of the game when the Penguin reaches the Icy region and is on its way home. The Icy region could not be implemented due to the time constraints.

### 2.2.3 Behavior of the platforms

Below are the different behaviors of the platforms:

The platforms during the initial stages of the game would be stationary as the difficulty level would be easy.

As the difficulty level increases, the platforms will start to move horizontally or vertically.

Another behavior of the platforms would be to decrease their size with the difficulty level and have a combination of moving and small size platforms.

Breaking platforms is a new concept which would be a new challenge to the players as they cannot jump on those platforms more than once. Doing that will break the platform and the Penguin will go down.

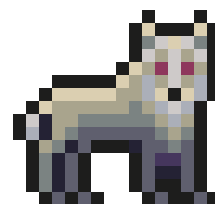
There will also be platforms that will have enemies such as a bear or a wolf on them. Landing on such platforms will activate those enemies to come towards you.

You will also have platforms with power-ups like fish and shields that will help you in the game.

### 2.2.4 Enemies

In this game we will have 2 enemies who will prove to be troublesome if the Penguin encounters them. They are:

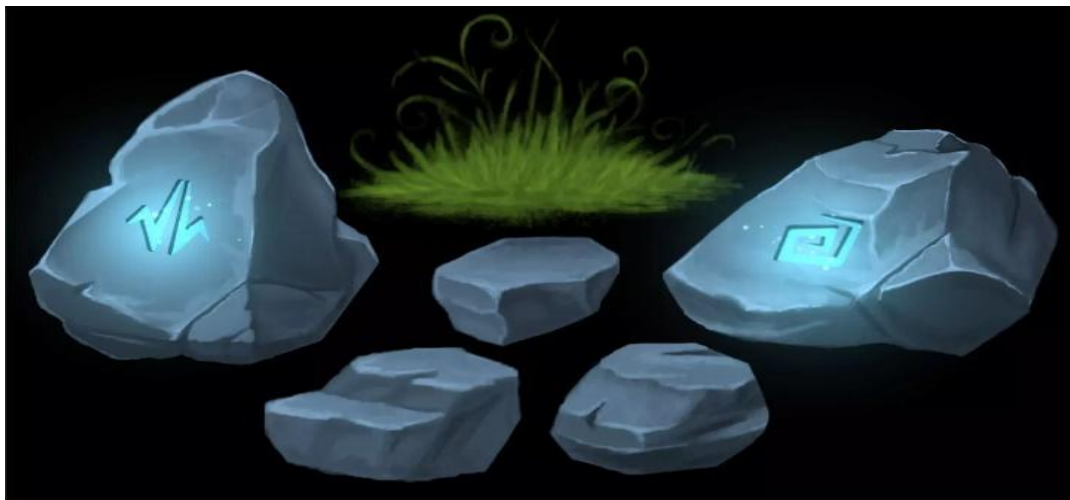
- **Polar Bear & Wolf:** These enemies are very protective about its area. Anyone who enters it, will have to face their wrath



### 2.2.5 Obstacles

Obstacles in the game are particularly important as they bring a challenge to the player and increase the difficulty with the gameplay. These will either be falling from above or will be on the platforms. We have identified different obstacles that will trouble the player based on the ongoing theme. Below mentioned are the obstacles that we will be using:

- The first category of obstacles are the ones which will be falling from above randomly. Upon hitting these obstacles, the player will lose his/her life.
  - [Stones](#)



### 2.2.6 Scoring System and Life

The scoring system will be based on how high the Penguin jumps. The higher the player goes in the game, the higher the points will increase. There are also fishes on certain platforms that will increase your points suddenly. The player will have only one life in the game, if he/she gets caught by the enemy or falls below the screen, the game ends at that moment and the player must start from the beginning.

### 2.2.7 Powers & Advantages

Powers are those important tools that the player collects during the game that will help him either increase the score or protect him from obstacles and enemies. We have identified 2 powers that will help the user during his gameplay such as:

- **Rocket:** This power tool will be available on some platforms, upon collecting which Penguin will skip the next 5 platforms and go up. Below is a sample image of the



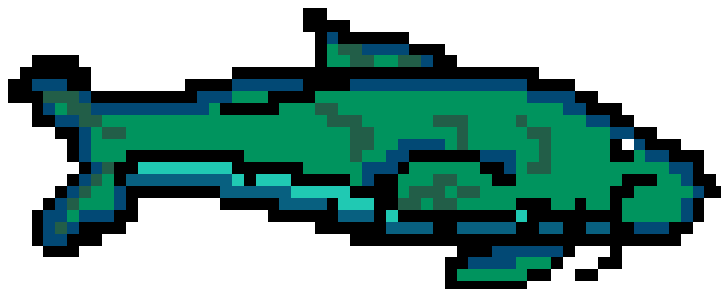
rocket power. Unfortunately, this power could not be implemented due to issues with the code.



- **Shield:** A shield is a time-based power tool upon collecting which will protect the Penguin from any obstacles or enemies for 5 seconds. Below is a sample image of the shield power.



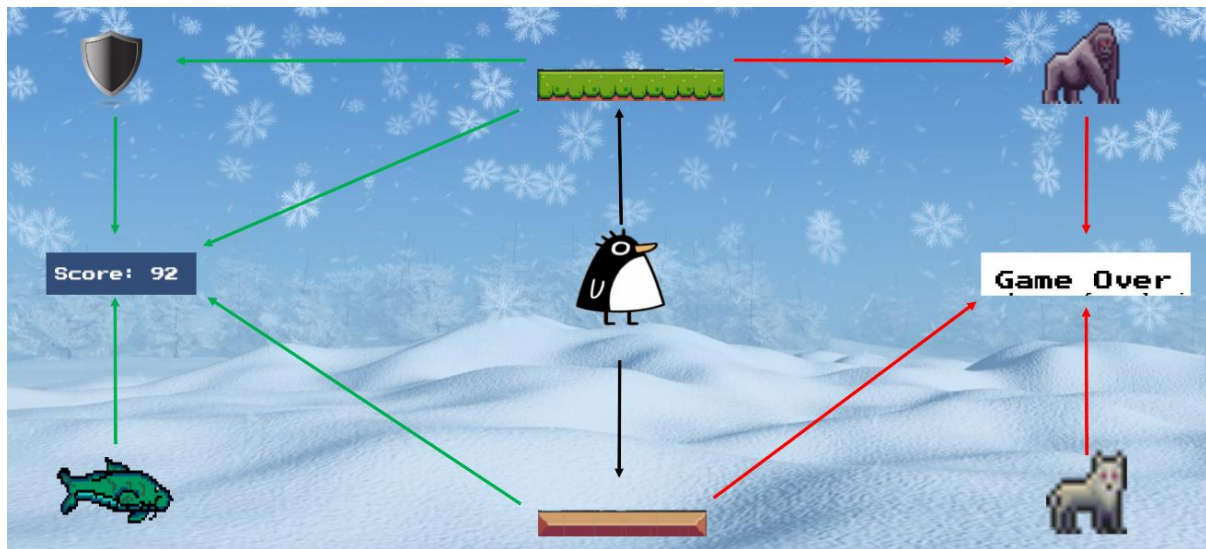
- **Fish:** A fish is a different category of power by collecting which the score will increase by 10 points.



### 2.2.8 Resource Influence Diagram

The resource implementation diagram is a way to explain how the resources influence the players in various ways. In the below diagram the green lines represent the way the resources influence the player to progress in the game. The red lines represent how certain resources

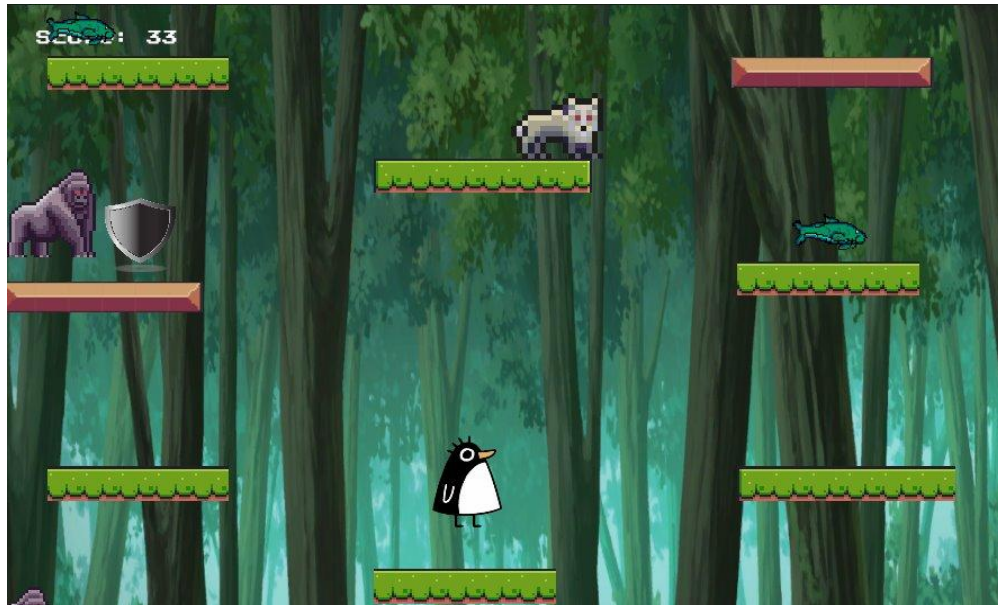
influence the player to lead to death. For example, collecting fish or shields from the platforms can help the player earn more points and progress further in the game. Hence it is shown connected with green lines. If the player encounters enemies on any platform, that will lead to player death and then the game must be restarted. This connection is shown using red lines in the below diagram. There are also scenarios where the a resource can also help in increasing points or might cause player death. Stone platform for example can give you points but can also harm you if you stay on it for long.



### 2.2.9 Tactical Decisions

Making tactical decisions in a game is very important as it will play an important role in keeping you in the game for a longer period. In this game, you will need to take some key decisions in less time to stay alive. Below are some scenarios where you would have to apply those decisions:

- There will be moments in the game where you will have to choose between whether you want to take a shield and progress in the game, or you can choose to collect the fish and earn more points. Below figure shows a scenario where if you jump to your left, you can get a shield and jumping to your right will earn more points.



- Another scenario in a game will be when you must choose between two paths, one which is a bit long but is safe. Another which seems easy and short, but it might be a trap as those platforms disappear if you stay on them for long time. Below image shows the scenario in the game:



### 2.2.8 Game Rules

- The player will only get 1 life throughout the game.
- Jump from one platform to another to ascend higher and to stay in the game.
- Make sure to stay safe from obstacles falling from above. If you hit any obstacle, you will lose your life.

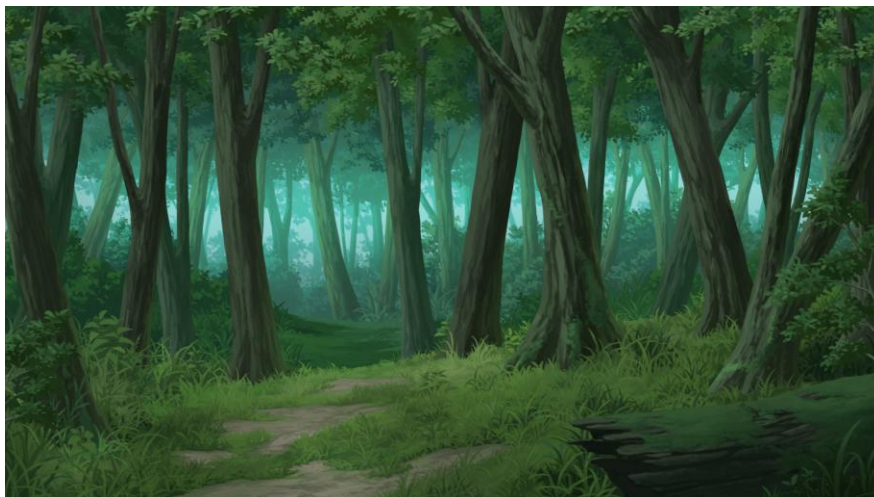
- Make sure to stay safe from enemies. If you are caught by the enemies, you will lose your life.
- Make sure you understand the behavior of the platforms as some are dangerous for your movement.
- Collect powers from the platform as they will help you excel in the game.

## 3. Graphics

### 3.1 Color Schemes

We will be using 2 different background themes in the game:

- **The forest theme:** The forest theme will be used in the initial stage when the Penguin will escape the zoo. This is the phase during which the platforms of wood and stones will be used. The hunter will be the enemy during this phase of the game. Below image shows the background used during the forest theme.



- **The Icy Theme:** The icy theme background will be used in the later stages of the game when the Penguin enters Antarctica. This is the phase during which the platforms of ice will be used. Also, the Polar Bear will be the enemy during this phase. Below image shows the background used during the Icy theme. Unfortunately, we could not incorporate this theme in the current prototype as we were stuck with the forest theme implementation and fell short of time to implement this theme.





## 3.2 Other Screens

### 3.2.1 Main Menu



### 3.2.2 Game Over Screen



### 3.3 In Game Music

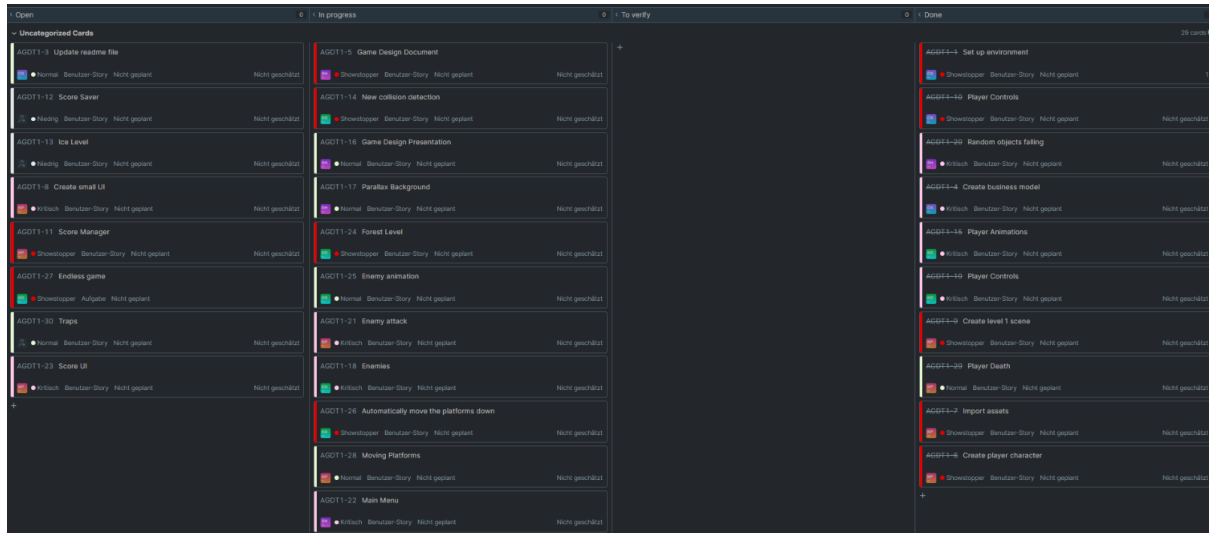
Game music plays an important role in giving a good impression of the game to its users. Choosing the right music is also important. You need to choose music that copes up with the pace of your game. In our case, since we have a game where you need to keep going up at a good pace, we have used music which has some fast beats.

Using sound effects in a game during certain movements of the player adds a good effect to the game and provides a good impression. In our game, we have used sound effects when the player jumps from one platform to another, when we collect shield or fishes and when the player dies. These effects helped us to enhance the game in a better way.

## 4. Team Management

### 4.1 Agile Boards

#### Penguin Jump



### 4.2 Meetings

12.02.2024

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Finalize 4 game ideas:
  - o Penguin Jump
  - o Space shooter
  - o Game similar to match 5
  - o Side scroller like Mario (dolphin swimming and collecting fishes)
- Choosing game engines: unity
- Choosing documentation & board platform: JetBrains YouTrack
- Introduction to Unity

15.02.2024

Present: Cris, Ketan, Sushant, Ambuj, Jordan, Roshan

Topics:

- What should be in the Game Design Document?
- Definition of GDD
- Creating Table of Contents of GDD

18.02.2024

Present: Cris, Ketan, Sushant, Ambuj, Jordan, Roshan

Topics:

- GDD ready for presentation

- Unity Setup
- Unity Prefab tutorial

## **19.02.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Defining player controls
- Introduction to YouTrack, Git & GitLab

## **22.02.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Development support

## **26.02.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Defining must haves, should haves & nice to haves

## **29.02.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Progress Update

## **04.03.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Progress Update

## **07.03.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Progress Update

## **11.03.2024**

Present: Cris, Ketan, Sushant, Kalpesh, Ambuj, Jordan, Roshan

Topics:

- Progress Update





## Links for Assets

<https://assetstore.unity.com/packages/2d/characters/2d-character-sprite-animation-penguin-236747>

(Penguin)

<https://assetstore.unity.com/packages/2d/environments/tileable-2d-terrain-platforms-2d-rpk-22006>

(Wood Platform & Stone Platform)

<https://assetstore.unity.com/packages/2d/environments/2d-ice-platform-pack-39371> (Ice Platform)

<https://vgdr.itch.io/snow-lake-background-pack> (Icy Background)

<https://assetstore.unity.com/packages/2d/environments/background-for-mobile-games-portrait-2d-art-246460> (Forest Background)

<https://assetstore.unity.com/packages/2d/environments/2d-hand-painted-magical-rocks-and-stones-free-260209> (Stones)

<https://assetstore.unity.com/packages/3d/vehicles/space/atom-rocket-model-140021> (Rocket)

<https://agdawkgamedev.itch.io/free-fish-assets> (Fish)

<https://pngimg.com/image/103577> (Shield)

<https://deepdivegamestudio.itch.io/animalassetpack> (enemies)

# References

## 1. Player Movements

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=2>

## 2. Player Animation

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=4>

## 3. Collision

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=6>

## 4. Collect and Count Items

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=7>

## 5. Shield Implementation

<https://www.youtube.com/watch?v=kV8sq6dUHfk>

## 6. Player Death

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=8>

## 7. Sound Effects and Background Music

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=11>

## 8. Multiple Levels

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=12>

## 9. Game Over Scene

<https://www.youtube.com/watch?v=Ii-scMenaOQ&list=PLrnPJCHvNZuCVTz6lvhR81nnafla-b67U&index=13>