



## DEVELOPMENT OF GAME SEASON EXPLORER USING CONSTRUCT 2

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### Abstract

Children self-taught install many games on their gadgets so they can play in their free time. Because children feel bored, games are a solution for parents to overcome them. In addition to encouraging children's creativity and imagination, playing games can develop skills as well as a means for developing thinking patterns/ problem solving, using children's logic and instincts whose hopes can also develop their talents or abilities and direct them to positive things. With the waterfall method, game development is made manually and in stages starting from the visual background, actors, and other elements in the game, using the construct 2 application as supporting software in game development. The quality of the game based on the results of the questionnaire given to the respondents is in the existing picture. The game "Season Explorer" still has a few problems during the game. 17.6% of all respondents' opinions, respondents gave various suggestions. These suggestions are to add more obstacles, improve the level of the game, actors can be developed again, add more musical instruments which are suitable for children's daily lives because the game is more specifically for the children's category and overcome errors when the game is played.



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### 1. INTRODUCTION

In the current development which is increasingly towards modernization, demands in various aspects of life are felt by many people more and more, resulting in high levels of stress in various circles of society. To avoid overdoing it, we need time to refresh and rest. Therefore there must be a means to escape from the heavy burden and feeling of boredom experienced in life, for example by playing games. Games created aim to entertain and fill spare time. They are often liked and played from small children to even the elderly. Along with the development of an all-technological era like today, the changes are growing rapidly, now the game has turned into a digital game. The game is quite influential and important for the development of the human brain

which can help increase human concentration itself. There are various kinds of conflicts and problems which require players to be able to finish the game quickly and precisely [1].

Humans look for solutions, solve a puzzle and start thinking when faced with an existing problem. In a game which is being played, players will certainly be faced with various kinds of problems which of course players are also required to solve so that players can win a game which has been played. Games can also help humans to develop their skills through the process of playing a game.

This game is a platformer game with 2-dimensional (2D) graphics. The platformer itself is a game genre whose main playing mechanic is the existence of a foothold or platform which will be used as a path for the characters in the game and there is

also a gravitational force. The platformer genre game has a main character which can be controlled by the user so that he can jump over obstacles such as traps, ravines and obstructing objects by jumping over the platforms in the game. Main characters, enemy characters and elements in platformer games are generally displayed from the sides of the game. The main action in the platform game genre is to jump, both on the enemy character and on the main character. An example of a platform game which is similar to the game to be made is Super Mario Bros.

Mario Bros is one of the most popular games till now and known for a long time. Mario is a fictional character created in-game by Shigeru Miyamoto, a game designer who serves as Nintendo's mascot. As Nintendo's mascot, Mario Bros is one of the most popular characters in gaming history. Mario Bros itself became the beginning of the creation of various types of games. More than 201 million Mario games have been sold, making the Mario Bros series the best-selling game series. The Mario Bros game has an OST (original soundtrack) entitled Super Mario Bros. The Super Mario Bros soundtrack is the game's most synonymous music. Apart from being heard in the game, we can also listen to the Mario Bros OST which is presented in various forms of performances such as orchestras, bands, etc [10].

2D games are games which generally and mathematically have 2 axes. Axis 1 is the (x) axis and axis 2 is the (y) axis, so it has the camera focus on the game directly and is visible to the players. Game design and development apply the Waterfall method. The Waterfall method is the earliest SDLC approach used for software development. The sequence in the Waterfall Method is serial, starting from the process of planning, analysis and design, as well as implementation of the system.

## **II. LITERATURE**

### **2.1. Previous research**

Previous studies aim to make comparisons and references. Previous research can be used as inspiration for further research and can be positioned as a form of originality of a research. In this section, there is a summary of previous research which can be used as a reference for other research, both published research and unpublished research. The following are some references to previous research which are still related to the theme which the author is studying.

Mokhammad Ridoi's research results (2018) mention an easy way to make educational games a Simple Construct 2 Tutorial. This study discusses an easy way to make learning media using construct 2 accompanied by simple

educational games. Based on the research results of Jefry Andreantoni and Eko Nur Wahyudi (2017), this research is about the Mario Bros Game Application Hard Player version for Windows where in this research discusses the design of Mario games by adding and changing each Stage, so that it is different from the original Mario Game made by Nintendo.

### **2.2. The Definition of Games**

Game comes from English. Game in general is a recreational activity with the aim of having fun, filling spare time, or light exercise. The game is usually done alone or together. Game is a structured or semi-structured activity which is usually intended for entertainment and can sometimes be used as a means of education. The characteristics of games which are fun, motivating, addictive and collaborative make this activity popular with many people (Wahono, R.S. 2009) [2].

The game consists of a set of rules which can build a situation to compete from two or up to several people or groups by choosing a strategy which is built to maximize individual wins or to minimize cloud wins. The rules determine the possible actions for each player, and a certain amount of information is received by each player as the progress of play, and a certain amount of wins or losses in various situations. (Febriyanto Pratama Putra, 2012) [3].

### **2.3. Game History**

Game development began in the 1950s at the University of Manchester (Manchester Mark 1), University of Cambridge (EDSAC), University of Pennsylvania (EDVAC) and Princeton University (IAS machine). This is the place where video games started as our daily entertainment. Previously, video games were divided into three categories: training and teaching programs, research programs and demonstration programs to entertain the public [9].

It is possible that the first video game created to entertain the public was Tennis for two designed by William Higinbotham and built by Robert Dvorak at the Bethoven National Library in 1958, which was designed to provide public entertainment at Brookhaven's annual open house event. This game used a computer with an analog system, but Higinbotham did not plan to commercialize this because in the past the tools needed to play this game were very rare and expensive [9].

### **2.4. Definition of Game According to Experts**

According to Raka (2014), the definition of games according to experts is as follows [2]:

1. Mitchell Wade  
Game is a great training environment for the real world in organizations which demand collaborative problem solving.
2. Ivan C. Sibero  
Game is the application most used and enjoyed by today's electronic media users.

3. Fauzi A  
Game is a form of entertainment which is often used as a refresher for the mind from fatigue caused by our activities and routines.
4. Samuel Hendry  
Game is an integral part of a child's daily life. Meanwhile, some parents accuse games of causing children's grades to drop, children not being able to socialize, and children committing acts of violence.
5. John Naisbitt  
Game is dynamic participatory system because game has a level of storytelling which films do not have.
6. Albert Einstein  
Game is the highest form of investigation.
7. Wijaya Ariyana & Deni Arifianto  
Game is one of the needs which is a big problem for computer users, because to be able to play games comfortably, all computer components must be of good quality, especially the VGA card.

## 2.5. Game Development Stages

Following are the stages of making a game according to Wicak (2013) [2]:

### 1. Stage of Research and Preparation of Basic Concepts

At this stage, basic ideas, objectives, themes, target audiences, technology, media (platforms), and various other boundaries are formulated. This research stage is a crucial stage, various basic elements of a game are arranged here.

### 2. Gameplay Formulation

At this stage, the game designers formulate the gameplay/ game mechanics used in a game. Gameplay is a pattern, rule, or mechanism which governs how the player interacts with the game being created.

### 3. Preparation of Assets and Level Design

At this stage, focus on drafting the concepts of all the characters and assets (including sound/music) needed. At the same time, the team also begins to design levels or group difficulty levels and the right assets for each level.

### 4. Test Play (Prototyping)

At this stage, a prototype/ dummy is presented to test the gameplay and the various concepts which have been compiled, both at each level and as a whole, as well as make the necessary improvements.

### 5. Development

At this stage, all the concepts (characters and assets) which have previously been compiled are fully developed, the game engine is developed, and all elements are integrated.

### 6. Alpha/ close beta Test (UX - Initial Balancing)

The main focus at this stage is to find out whether all the main components of the game

have been able to provide the expected user experience and also to detect whether there are technical problems which have not been detected at the previous stage.

## 7. Release

At this stage, the game is ready to be released and introduced to its target players. When a game has been released to the public it doesn't mean the development process is complete, but they are generally continuously optimized/ updated.

### 2.6. Platform Games

Platform games, which are also called platformers, are a genre in which the gameplay involves traveling between platforms. This genre is usually associated with cartoon characters such as Mario, although it may have other themes. Traditionally, platform games are 2D, showing the game environment in only one perspective, usually from the side. Traditional elements of the game include running, jumping and climbing ladders or steps. This genre often borrows elements from other genres such as fighting and shooting [4].

### 2.7. Constructs 2

Construct 2 is an HTML5-based game creation tool specifically for the 2D platform developed by Scirra. Construct 2 does not use a special programming language because all commands used in the game are arranged in an EvenSheet which consists of events and actions. So to develop games with constructs, users don't need to understand programming languages which are relatively more complicated and difficult [5]. Some of the Construct 2 features are as follows [6]:

#### 1. Quick and Easy

Construct 2 has a fast and easy to understand ribbon interface. Whatever is seen in the layout design is the view which is obtained when the game is run.

#### 2. Powerful Event System

Construct 2 can create games in a way which is easy to read visually because there is no need to use a complicated and cryptic programming language.

#### 3. Flexible Behaviors

Behaviors provide an instant way to add object capabilities, speeding up construction and increasing productivity, for example adding a platform behavior to a sprite object which allows the object to run and jump.

#### 4. Instant Previews

The game will display and run in the browser window when tested. Apart from that, there is a preview over wifi which allows every cellphone, tablet, laptop, or other PC connected to a LAN/ wifi to also be able to immediately see game previews.

#### 5. Stunning Visual Effects

There are more than 70 GL web-based effects for warp, distort, blend, blur, mask, re-color and more.

Developers can add these to objects, layers, and layouts for fast special effects and create amazing results.

**6. Multiplatform Export**

Construct 2 can publish games on a wide choice of platforms with just one project. Game construct 2 can be published on web-based platforms such as chrome web store, facebook, firefox marketplace, and others.

**7. Easy Extensibility**

Construct 2 comes with more than 20 built-in plugins, more than 20 behaviors and more than 70 visual effects. It starts from the appearance of text and sprites, sound and music, input, data manipulation and storage, particle effects, movement effects, and others.

**III. RESEARCH METHODOLOGY**

**3.1. Framework**

Research is carried out to channel curiosity about problems with certain treatments such as examining, and studying carefully to get answers. The type of research method approach taken is descriptive research, research which solves the problem based on data obtained by analyzing and knowing what problems occur so that the solution obtained is by making the "Season Explorer" game application gradually object-oriented. While in the making, this game project uses the waterfall method which is serial in nature and the oldest software development method which is widely used. The following describes the framework for making this game. The framework is divided into steps, then each step is explained [7]:

**1. Requirements Analysis**

Information data collection related to the project is made by finding or submitting problems as well as the goals and objectives of the development, then starting to disseminate survey forms, then processing the results until all the needs of prospective users are obtained which are used in the development of the "Season Explore" game.

**2. System and Software Design**

The results which are obtained in the previous stage (requirements analysis) are re-analyzed to be implemented in the development design with the aim of providing a complete initial picture along with details of the project development which is made.

**3. Implementation and Unit Testing**

This is the programming stage (starting with the creation of software which is divided into small modules which are combined in the next stage) as well as testing and checking of the programming which has been made.

**4. Integration and System Testing**

After going through the testing, what is done next is integrating it into the system as a whole so

that inspection and testing of the system as a whole can be carried out and identify whether the system still has errors or deficiencies.

**5. Operations and Maintenance**

Software which has been made and tested before can be operated by users and carried out maintenance by fixing errors and improving the implementation of system units as well as increasing system adjustments as needed.

**IV. RESULTS**

Based on the research which has been done in making Game Season Explore, the following results are obtained:

**4.1. Game Goals**

The initial stage is to determine the purpose and users of the application which has been made. The goals of making this desktop-based "Season Explore" game application are:

1. Relieve Stress  
Platformer genre games are designed to relieve stress or the boredom and boredom experienced by humans.
2. Increase Brain Concentration  
The game is quite influential and important for the development of the human brain which can help increase human concentration itself. Humans will look for solutions, try to solve a puzzle and start thinking when faced with an existing problem.

**4.2. Game Description**

The platformer genre game has a main character which can be controlled by the user so that it can jump over obstacles such as traps, cliffs and obstructing objects by jumping over the platforms in the game. The main action in platform games is to jump, either on the enemy character (c19) or on the main character (winter).

The main playing mechanic is the existence of a foothold or platform which is used as a path for the characters in the game and there is also gravity. In a game which is being played, players are certainly faced with various kinds of problems which of course players are also required to solve so that players can win the game which has been played.

**Table 1.** Game Specifications

Information	Description
Title	"Season Explorer".
Audience	Children
Genre	Platformer
Audio	Vocals and Backsound Music
Animation	2D
Interactive	Choose the menu and play the game
Results	Get a score in the form of coins during the game, also a key to

increase the opportunity to play at the next levels.

The game "Season Explorer" is made with an educational element in it about the various seasons in the world. Players are expected to be able to find solutions to face obstacles and learn seasons because each level features spring, summer, autumn and winter backgrounds.

The game play "Season Explorer" begins with the home page as well as music and sound settings in the game. Players can choose a level on the level section page and then can start the game. Players must pass obstacles in the game also collect coins. Apart from collecting coins, players can get keys to increase the chance of continuing the game if they can't get past c19 in the game. When the level is finished playing, the game can be continued to the next level by accumulating coins and keys first. The game continues if there are still keys left. If there are no remaining keys then the game ends on the "Game Over" page.

**4.3. Game Components**

Following are the main components in the preparation of Game Season Explorer [7]:

1. Game Overview  
Containing brief information about the Game Concept Feature Set, Genre, Gameplay and Target Audience.
2. Design level  
Designing each level, including the features, difficulty, and theme of each level.
3. World Design  
Designing the in-game world, the setting of events, and the overall theme of the games covered in it.
4. User Interface Design  
Designing Screen Flow, Screen Description and designing user interaction.

**4.4. Character**

The main character's model and the opponent's character are different. The main character of the season explore game is called "winter", and the opposing character is called "c19". What distinguishes each character is the color and shape. The main player character is faded gray and white which is associated with good character. The choice of this color symbolizes the player's independence and sense of responsibility to finish the game. Opposing characters are red and black which are associated with evil characters. The choice of this color symbolizes a strong and confident aura, but this character has a sense of arrogance where the opposing character does not want to be defeated and tries to make the main player character die.



Figure 1. Winter's character model when standing



Figure 2. Winter's character model when falling



Figure 3. Winter's character model when dying



Figure 4. Winter's character model when walking



Figure 5. Winter's character model when jumping



Figure 6. C19 character model when standing



Figure 7. C19 character model when dying



Figure 8. C19 character model when flying



Figure 9. C19 character model when swimming



Figure 10. C19 character model when running

**4.5. Game Design**

In this design, there are steps which must be done, including:

**1. Define Game Genres**

This Season Explorer game belongs to the Mario genre game, which guides the character to jump between platforms, obstacles, or both to continue the game. Tantangan-tantangan ini dikenal

sebagai jumping puzzle atau free running. The player controls the jumps to avoid the avatar falling off platforms or failing to make the required jumps. The most common unifying element of games of this genre is the jump button. The game mechanic takes place where the player guides the character to jump between platforms and obstacles, in another genre known as platforming, another word derived from platform [7].

**2. Define Tools**

This Season Explorer game uses the main Construct 2 software because it is easier to work on. Construct 2 can also be developed to build desktop applications, browsers, Android and others [9].

Below is the overall result of designing and developing a game application design with the theme "Season Explorer".

**Home**

The main display which appears when the Season Explore game is run for the first time. The display provides the nuances of a beach background, the "Play" button which functions to start the game.



Figure 11. Home

**Sounds and Music**

The main display in the lower right corner has sound and music, where we can adjust whether the game sound is turned off or not.



Figure 12. Sound & Music

**Section Level**

After pressing the play button on the main menu, directed to the level select section, the first one which opens is only level 1 and the other levels are locked. To open it, you must first complete the previous level, and vice versa.



Figure 13. Level Select

**Game of Level 1**

On display level 1, there is a spring background. On the top right side, there is the Home Menu to return to Home, there is sound, music, collecting coins, there are a number of hearts as game lives and collecting keys to win, and there are buttons right, left, up to move the player.

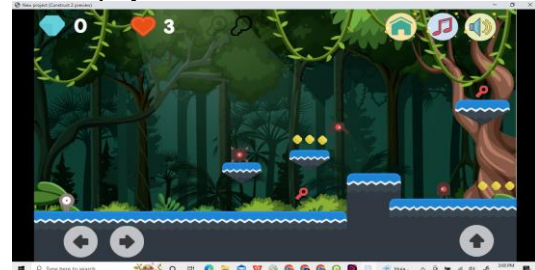


Figure 14. Display of Level 1

**When Section Level 1 is finished**

After all the obstacles are resolved, the complete level automatically appears by displaying the results of the points earned by the player. Then press play to continue the game.



Figure 15. Complete Levels

**When Section Level 2 begins**

At level 2, the procedure for playing is the same as the previous level. What distinguishes it is the appearance of the game only in summer.



Figure 16. Section level 2



Figure 17. Game of Level 2

**Game of Level 3**

At level 3, the procedure for playing is the same as the previous level. The only difference is how the game looks in winter.

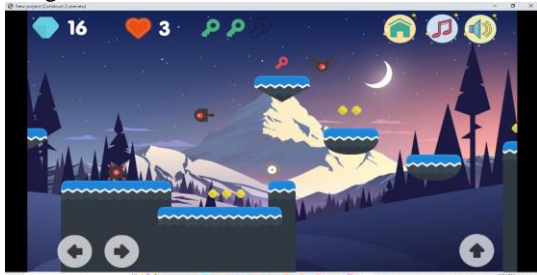


Figure 18. Display of level 3

**Game of Level 4**

At level 4, the procedure for playing is the same as the previous level. What makes it different is that the game looks in the fall.



Figure 19. Display of level 4

**Bots regarding c19**



Figure 20. Display exposed to c19

**Game over**

If the player's life runs out, a Game Over display will appear, where the player must repeat the level.

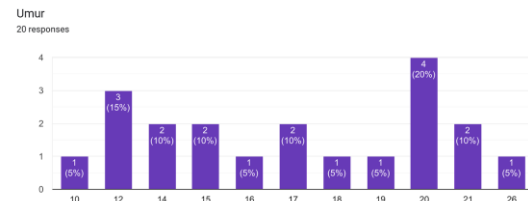


Figure 21. Display of Game Over

The Season Explore game design can be used by installing it on all devices via the following link: <https://seasonexplorer.netlify.app/>

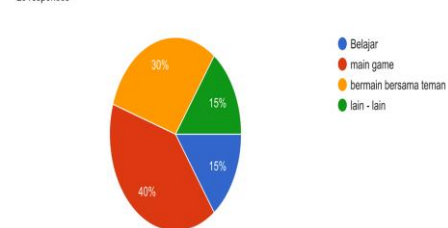
**4.6. TESTING**

The Game Season Explorer application which has been designed is tested to the public via Google Form whether the contents match the storyboard, run well on the platform, the buttons work properly and the game is free from errors. The application is exported to .exe. format. The following is a diagram of the survey results:



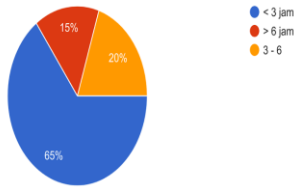
Vulnerable age of players between 10-26 years who have played, with the age of 20 being the most 4 respondents who have tried the Season Explorer Game.

saat ada waktu luang sering digunakan untuk apa ?



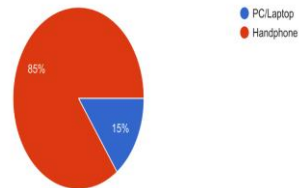
Respondents who spend most of their spare time in this test are playing games which earn (40%) more from studying (15%), playing with friends (30%) and others (15%).

dalam sekali bermain berapa jam biasanya anda bermain game ?  
20 responses



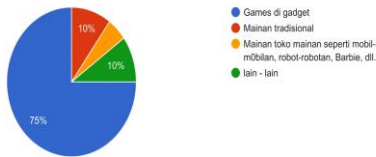
On average in playing games, respondents who spend the most time playing games (65%) are < 3 hours, (20%) > 6 hours and (15%) 3 - 6 hours.

Anda biasanya bermain game menggunakan.....  
20 responses



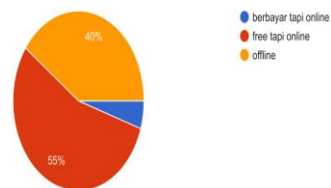
Respondents use cell phones more (85%) as a gaming platform than PCs/Laptops (15%).

Mainan yang kalian sukai ?  
20 responses



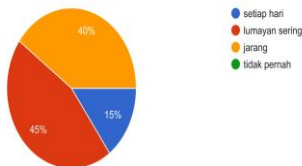
The games most liked by respondents are games on gadgets which get (75%) while (10%) play traditional games and others.

anda lebih menyukai game yang.....  
20 responses



Respondents prefer games which are free but online (55%) more than offline games (40%) and even paid games but online (0%) are not liked by respondents.

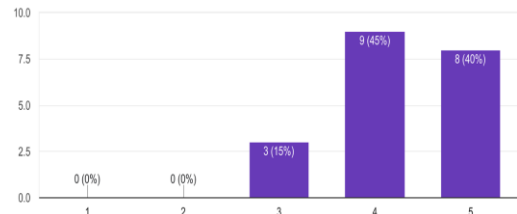
seberapa sering kamu bermain game dalam seminggu?  
20 responses



How often respondents play games in a week with the most results is fairly frequent (45%), rarely (40%) and every day (15%).

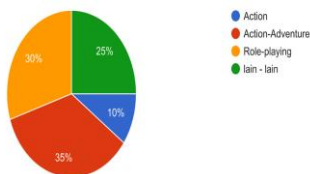
The following diagram shows the results of testing the Game Season Explorer application.

Keseluruhan Tampilan Interface  
20 responses



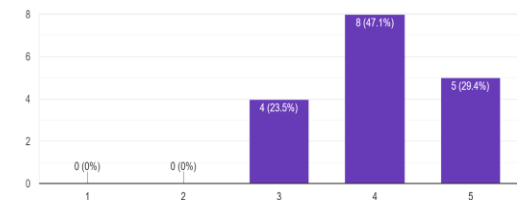
The overall appearance of the Season Explorer Game Application Interface with the most results (45%) with 9 respondents, (40%) with 8 respondents and (15%) with 3 respondents.

game apa yang sering anda mainkan ?  
20 responses



Based on the games which respondents often play, the acquisition of action-adventure games is more (35%), which means that respondents play action-adventure games more often than role-playing games (30%), action games (10%) and others (25%).

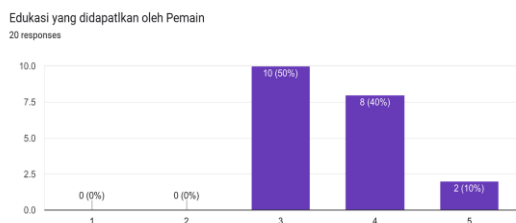
Kecocokan Aplikasi jika dimainkan oleh anak anak  
17 responses



The suitability of the Game Season Explorer application achieves the most results, 47.1% with 8



respondents, 29.4% with 5 respondents and 23.5% with 4 respondents.



Season Explorer is an educational game which achieves the most results, 50% with 10 respondents, 40% with 8 respondents and 10% with 2 respondents.

## V. CONCLUSION

Based on the game "Season Explorer" several conclusions are obtained. Game Season Explorer can be played by all ages but only for players in the children's category and can already be played with multiple players (multiplayer). The design and development of the game "Season Explorer" was motivated by children who like to play gadgets to fill their free time. By collecting data through surveys, mobile-based games can be made using tools construct 2, actors and elements are made using Canva tools.

The quality of the game based on the results of the questionnaire given to the respondents is in the existing picture. The game "Season Explorer" still has a few problems during the game. Expressed by 17.6% of all respondents' opinions, respondents gave various suggestions. These suggestions include adding more obstacles, further improving the level of the game, actors can be developed again, increasing the number of musical instruments which are suitable for children's daily lives because the game is more specifically for the children's category and overcoming errors when the game is played.

After the Season Explorer Game has been successfully made and can be run, the author realizes that there are a number of things which need to be added or updated in it, for example replacing the main player character "Winter" with a bigger one so that it can distinguish it from the enemy character "c19", making a display guide game before the game starts so that later players can better understand running the game, a magnificent celebration when users can complete challenges and win games at every level.

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