



## Design and Development of the “PETUALANGAN AKSA” Game as Javanese Alphabet Introduction Media

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### ABSTRACT

Javanese script is one of the materials in Javanese language subjects that begin to be studied at the elementary school level. In SDIT Bina Insan Kamil Sidareja there are still many students who do not understand and have difficulty in learning Javanese characters. Factors that influence students' difficulties in learning Javanese characters are because students very rarely intersect with Javanese characters in everyday life. Teachers have not used learning media that can attract the attention of students. Overcoming these problems, researchers used the Luther-Sutopo version of the Multimedia Life Development Cycle (MDLC) development model in making the Aksa Adventure game as a medium for introducing Javanese script in Grade 4 SDIT Bina Insan Kamil Sidareja. The purpose of this study was to design the game "Petualangan Aksa" and test the feasibility of the game "Petualangan Aksa" as a medium for introducing Javanese script for grade 4 students at SDIT Bina Insan Kamil Sidareja. The benefits of research are to know the stages of making games and to know the feasibility of media as an introduction to Javanese script at SDIT Bina Insan Kamil Sidareja. After alpha and beta testing, the results of the "Petualangan Aksa" game research obtained a score of 97.14% for the material validation test, 88.77% for the media validation test and 88.54% for the beta test so that it was very feasible to use. The conclusion of the study is that researchers have successfully designed the game "Petualangan Aksa" as a media for introducing Javanese characters at SDIT Bina Insan Kamil Sidareja.

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## 1. INTRODUCTION

Java characters or what is commonly called Carakan or Hanacaraka is one of Indonesia's invaluable cultural wealth. During the triumph of the kingdoms in Nusantara, the characters of Java experienced a period of success. These Java characters began to appear in the time of the Islamic Empire or around the 17th century BC, but their printed forms only appeared in the 19th. At that time the characters of Java became the main characters used by the society (covering the territories of Java, Sunda, Madura and Bali) in various fields such as literature, art, religion, education, government and others. (Sulaiman, 2011).

With the development of the era, the use of the Java characters began to be replaced by the Latin characters. Nowadays we find very rarely Java characters in everyday life, only a few in Java subjects at school. This condition makes the existence of Java characters as one of the cultural wealth of Indonesia increasingly threatened by its existence. The remnants of the triumph of the Java characters can be found in ancient manuscripts, inscriptions, and other historical relics.

It has been our responsibility as the Indonesian nation, especially as the successor generation of the nation, to keep keeping the cultural wealth of Indonesia sustainable and unharmed by the development of the times. One of the efforts the government has made is to include it in the educational curriculum, i.e. in local loading subjects. Java characters themselves are in Java subjects that have been studied since the elementary school bench. According to the results of an interview with Mrs. Umi Mungadah as a teacher of Java at SDIT Bina Insan Kamil Sidareja, one of the factors that makes students difficult to learn or memorize Java characters is because students rarely interact with the Java character, students need training against the use of Java character. This is in line with the findings of Astuti (2018) in his research found that the difficulties experienced by the students are influenced by several factors among them is writing using the characters Java is no longer used in everyday life so makes the students not interested in studying it, teachers have not used the model and learning media that can attract the students' attention. Learning media is one of the factors that plays an important role during the learning process and determines learning outcomes.

Educational games have become one of the media that is judged to be quite effective in the learning process. It's proven in some studies. Based on Mahardika & Sulistiyo study, (2020) entitled "Development of Educational Games as Role Play Game Based Learning Media (RPG) At the Point of Learning Planning and Installation of Audio Systems in SMK Negeri 2 Surabaya" it was obtained that the level of effectiveness reviewed from the availability of student learning results showed that average learning outcomes have exceeded KKM (KKM=75) which is 83.73 so that RPG can be said to be effective as a learning media. Aristana & Desmayanti, (2020) in her research entitled "Balance Character Identification Educational Game Build Design" succeeded in producing an educational game that could introduce Bali Characters and provide a different perspective on the game. In addition, according to Mrs. Umi Mungadah students in 4th grade SDIT Bina Insan Kamil Sidareja are also more inclined to choose to play games than to learn so that it can make children more interested and accustomed to the characters of Java if packed into the form of the game. Based on the background, it is necessary a learning media that can attract the attention of students to be more interested in the use of characters in Java so that students of 4th class SDIT Insan Bina Kamil Sidareja is easier in learning and understanding the character of Java.

## **2. METHODS**

The research design used in the study this time is the Multimedia Development Life Cycle (MDLC) version of Luther Sutopo in (Binanto, 2010). The multimedia development model consists of six stages: concept, design, material collection, assembly, testing and distribution.

### **2.1. Concept**

The Concept Concept is an early stage in this multimedia development model. This phase of the concept aims to determine the purpose and identification of the audience or target user of the application or program.

### **2.2. Design**

Design is the stage of making specifications regarding application or program architecture, style, appearance and material requirements for an application or programme.

### **2.3. Material Collecting**

Material Collecting is a stage in which the author collects material that matches the research needs. These materials can be graphical assets, audio backgrounds, animations and others that are needed in the next stage of the production process.

### **2.4. Assembly**

Assembly is the stage in which all objects or multimedia materials are created. The creation of the application or program must be based on the design stage and using the materials collected at the collection stage. (material collecting).

### **2.5. Testing**

Testing is carried out after the completion of the assembly phase by running an application or program that aims to see if there are errors or not. This phase consists of two phases of testing, the alpha test and the beta test. Alpha tests are carried out by media experts and material experts, while beta tests are conducted by users of applications or programs.

### **2.6. Distribution**

Distribution is the stage in which an application or program is stored in a storage medium accessible to the user. This phase can also be called the evaluation phase for the development of a product that is already done in order to be better. The evaluation results can be used as an input to the conceptual phase of the next product.

### **2.7. Population and Samples**

Population in this study were students of 4th grade SDIT Bina Insan Kamil Sidareja who totaled 81 students. Non-Probability Sampling is a sampling technique that is deliberately selected from a population (Purwanto & Sulistyastuti, 2017). Then the samples taken in this study are students of class IV A SDIT Bina Insan Kamil Sidareja with a total of 23 people.

## 2.8. Research Instrument

A research instrument is a tool used to gather data to support the success of a research. The quality of a research is often seen from its research instruments. The use of the right instruments will show results that match the purposes of the research. The research instruments used in this study are a lift consisting of a material expert validation lift, a media expert validating lift and a student response lift. The measurement scale used is a likert scale where raw data is a number that is then interpreted into a qualitative sense.

## 2.9. Data Analysis

This research uses descriptive static data analysis techniques. Descriptive statistical analysis is statistics used to analyze data by describing or describing data that has been collected as it is without the intention of making general or generalized conclusions (Sugiyono, 2015).

The study uses a likert scale to analyze the results of media expert validation, material validation and student response. The data obtained will be analyzed using a likert scale with points 1 to 5 on each question. The data will be translated into **Table 1**.

**Table 1.** Likert Scale Measurement.

Score	Information
5	Strongly Agree
4	Agree
3	Simply Agree
2	Disagree
1	Strongly Disagree

(Source: Sugiyono, 2018)

Scores obtained from the lift data will then be calculated using the rating scale calculation using formula 1.

$$P = \frac{\text{acquisition score}}{\text{ideal score}} \times 100\%$$

Description:

P = percentage.

Acquisition score = average score obtained from all respondents.

Ideal score = maximum score of the likert scale used, that is 5.

After obtaining the percentage number of scores, then the data is converted to a qualitative value using the study validation level by dividing it into five interpretation categories with scale details in **Table 2**.

**Table 2.** Alpha Test Percentage.

Score	Category
81% - 100%	Very Worthy
61% - 80,99%	Worthy
41% - 60,99%	Quite Worthy
21% - 40,99%	Unworthy
<20,99%	Very Unworthy

(Source: Sugiyono, 2018)

### 3. RESULTS AND DISCUSSION

#### 3.1. Concept

The concept phase is an early stage in the development of the educational adventure game product of Aksa. The concept that the researchers use in the process of the creation of educational game product in this research will be presented as follows.

##### a. Material Concept

Concept of material used in the manufacture of this game product is the basic Java characters material that exists in the Java language subjects of the 4th Grade of Basic School. The Java character material is selected based on the results of an interview with Mrs. Umi Mungadah as a teacher of Class 4 and teacher of the Java subject at SDIT Bina Insan Kamil Sidareja.

##### b. Media Concept

Media concept created in this research is an educational game based on Role Playing Game. This game uses a fictional story with a character named Aksa as the basis of the story of the game. The game is based on Unity 3D software and is targeted for the Android platform.

##### c. Visual Narrating

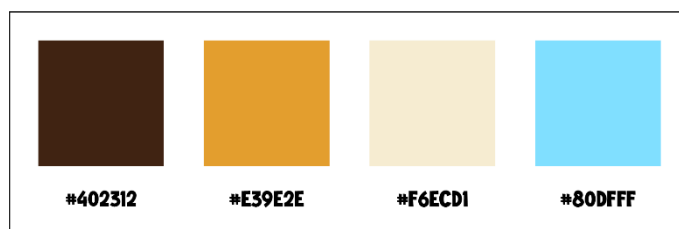
Role Playing Game is a genre of game that brings a fictional story where the player has to complete tasks or missions. This game tells the story of a boy named Aksa who's on an adventure in Majethi. The Majethi State is used as a backdrop because the Majethi state is the region of origin of the Aji Saka character in the story of the origins of the Java character that develops in the society. The Majethi state is described as an area still filled with ancient forests and many temples around it.

##### d. Graphic Concept

The Aksa Adventure game uses the graphic concept of flat design. The visual style of flat design is characterized by the simplicity of the shape, which provides comfort and facilitates in attracting the attention of the user (Yasa dkk., 2022). The use of flat design includes the creation of character assets, buttons, user interfaces, and Majethi State assets.

#### e. Color Concept

The main color palette used in the “Petualangan Aksa” game is four colors: brown (#402312), yellow (#E39E2E), cream (#F6ECD1), and blue (#80DFFF) as shown in **Figure 1**.



**Figure 1.** Color Palette.

#### f. Font Concept

The choice of fonts is one of the important steps because it affects the readability of the message to be delivered. To deliver the message with the maximum, it requires a font that is easy to read and has aesthetic value to be more attractive to the reader. The font used in this game is Jungler Adventurer, a type of Sans Serif font.

#### g. Audio Concept

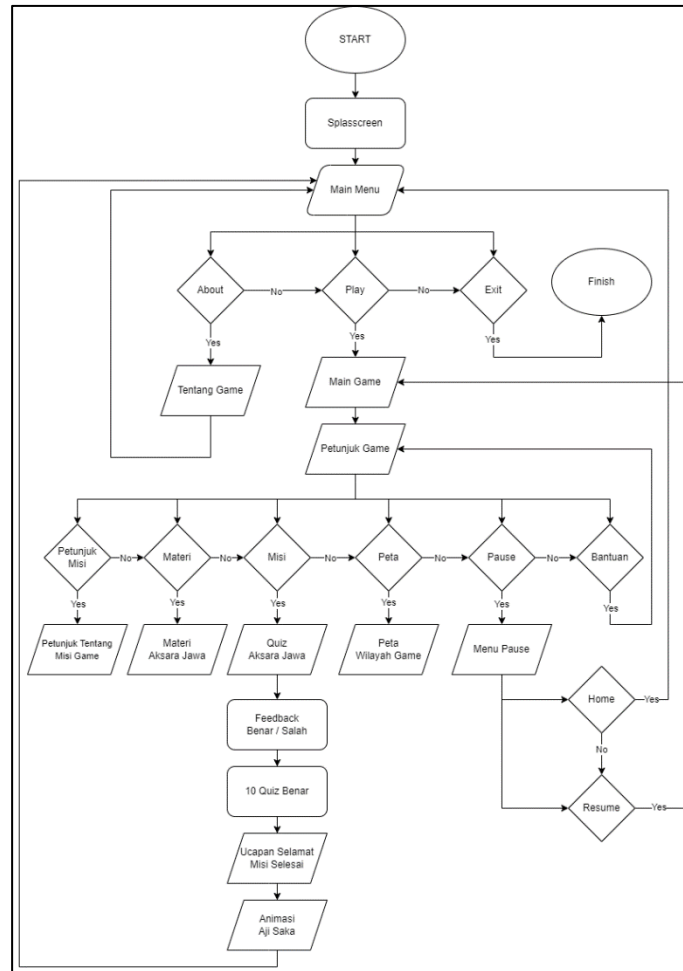
The audio concepts used in this game are as background and soundeffect. Backgrounds used in the play menu are music created by MOKKA Kids titled “Funny Children” and “Tribal Jungle Music” by Inca Empire in the game. Soundeffect is used as feedback from both the correct and the wrong quiz answers. All the used audio is accessed through the YouTube platform.

#### h. Video Concept

The video footage used in this game is as a Feedback when players successfully complete the missions on the game. The selected video is an animated video of the origins of the characters of Java that was uploaded by the Youtube channel Riri Child Stories Interactive with the title “Aji Saka – The Origins of Java Characters”. This video is used as a supportive factor to attract children’s interest and additional knowledge about the story behind the character of Java.

### 3.2. Design

The design stage is the stage in which game specifications are made, including game architecture, style, appearance, and material or material requirements required for the “Petualangan Aksa” game. In this stage of the research, the researchers divided into three stages to facilitate craftsmanship, namely designing materials, creating flowcharts, and creating wireframes. **Figure 2** shows the flowchart of the “Petualangan Aksa” game.



**Figure 2.** Flowchart Game “Petualangan Aksa”.

### 3.3. Material Collecting

The material collection stage is the stage at which the material required to make a game is collected. The material required is material, graphical assets, audio asset, font asset and video asset.

### 3.4. Assembly

The manufacturing stage is the stage in which after all the necessary materials have been collected at the previous stage, all these materials will be united into one unity or an integral product. At this stage, the researchers used some supporting software to work on the game, such as Adobe Illustrator, Unity 3D, Visual Studio Code and Corel Draw. At this point, the authors divided it into two parts: game environment creation and programming.

#### a. Environment Game Creation

Environment Game creation includes the creation of logos, characters, maps, panels and buttons. Each part will be described in more detail as follows:

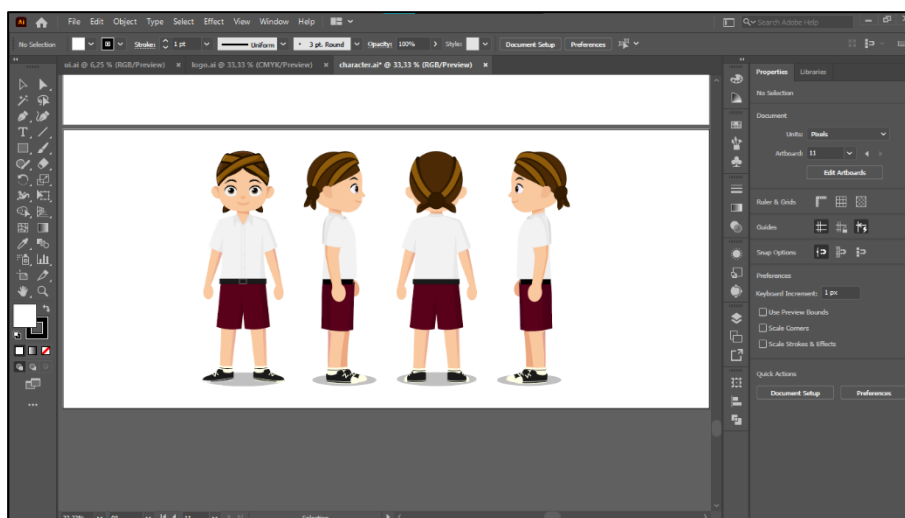
A logo is a graphic element in the form of an ideogram, symbol, emblem, icon, or sign used as a representation of a trademark. As the main attribute of the brand, this logo is physically

recognizable and becomes a symbol that represents the brand. (Oscario, 2013). The logo of the “Petualangan Aksa” game uses a combination of the game name logo with the logotype of the wooden shield that forms the background of the logo. The “Petualangan Aksa” game logo can be seen in **Figure 3**.



**Figure 3.** Logo Game “Petualangan Aksa”.

Aksa is the main character in this “Petualangan Aksa” game. Aksa is an adventurous SD student with a cheerful personality. Aksa is depicted wearing a red and white uniform and using a blank on his head as a symbol of love of culture. Aksa character creation is done using Adobe Illustrator software using the image tracing method. The process of creating Aksa character can be seen in **Figure 4**.



**Figure 4.** Aksa Character Creation Process.

The map meant in this case is the world where the game's background is played. In this game the background is taken is Majethi State. Majethi state is used as the background place because Majethi is the area of origin of the character Aji Saka in the story of the origins of the characters of Java that develops in the society. This map consists of many elements united into a unity. The elements are made using a refractive image as a manufacturing benchmark. The whole element is created and consolidated using Adobe Illustrator software as shown in **Figure 5**.



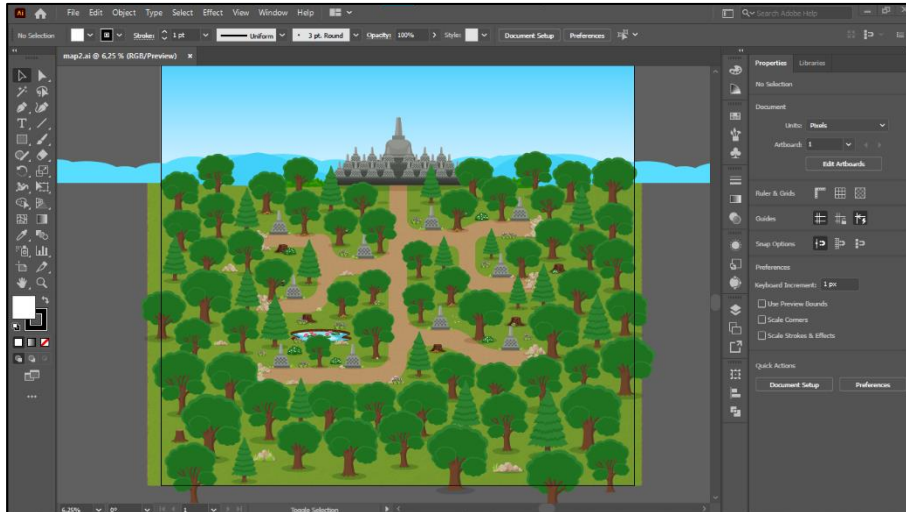


Figure 5. Game Mapping Process.

The panel referred to in this context is a pop-up panel that contains information according to the button pressed. There are several kinds of panel pop-up displays such as about pop up panel, Java character material, quizzes, mission instructions, game help, and pause. The panel creation process is done using Adobe Illustrator software as shown in **Figure 6**.

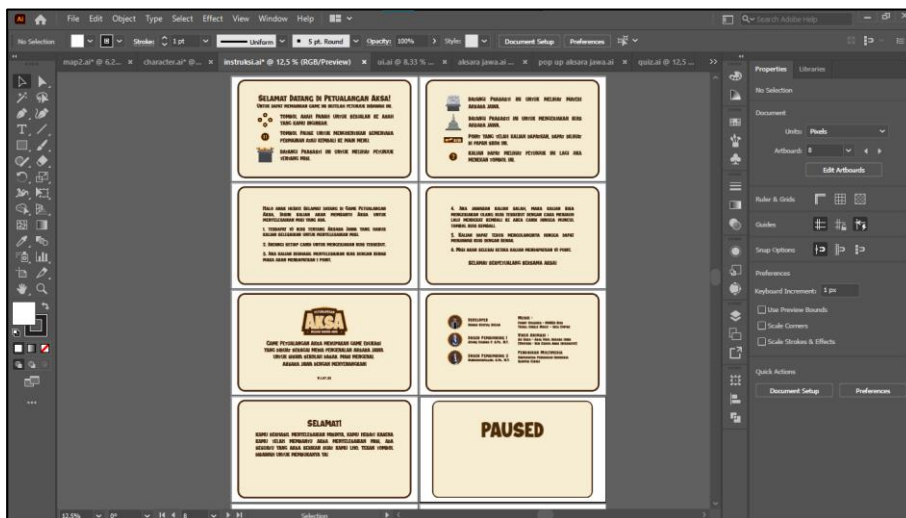


Figure 6. Game Panel Creation Process.

The last game environment creation is the creation of buttons or buttons according to that need. The buttons used in the “Petualangan Aksa” game are made using the CorelDraw 2019 software as shown in **Figure 7**.

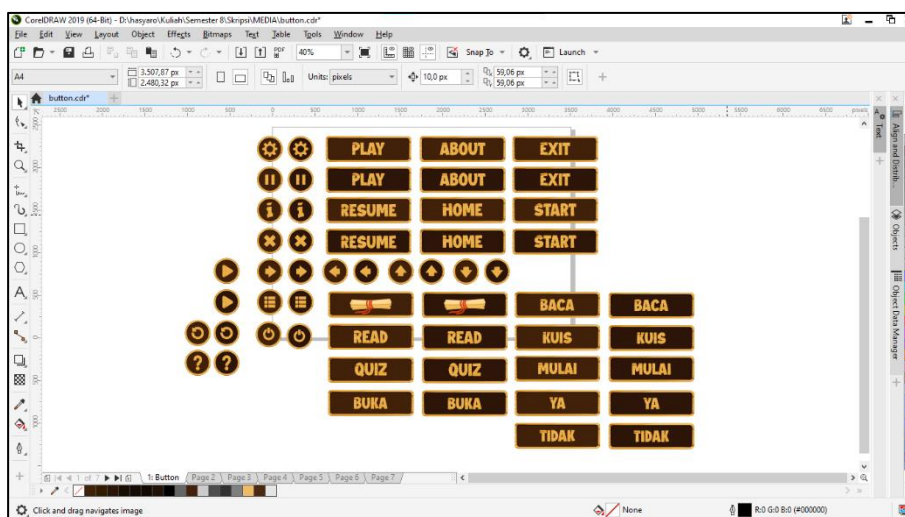


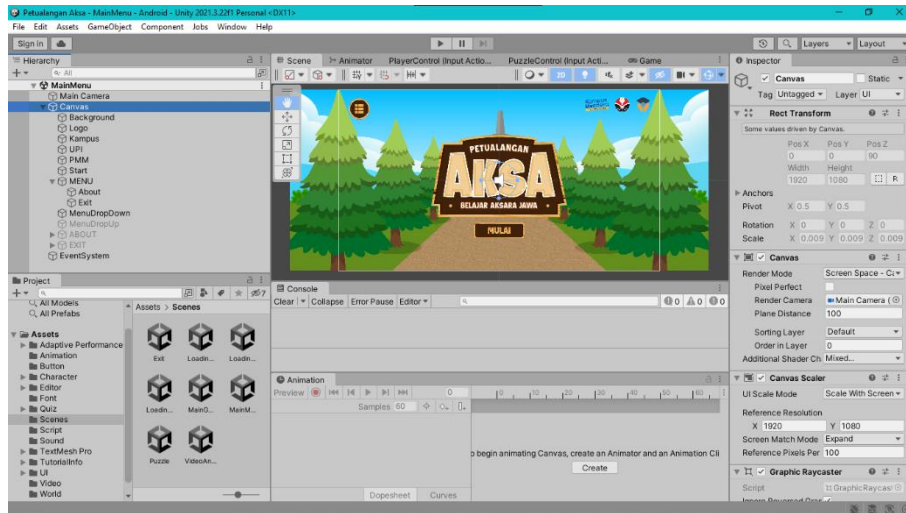
Figure 7. User Interface Button Creation Process.

### b. Programming

Once all game environments have been created, then proceed with game creation using Unity 3D software version 2021.3.22f1. Game creation refers to the concept, flowchart and wireframe previously created.

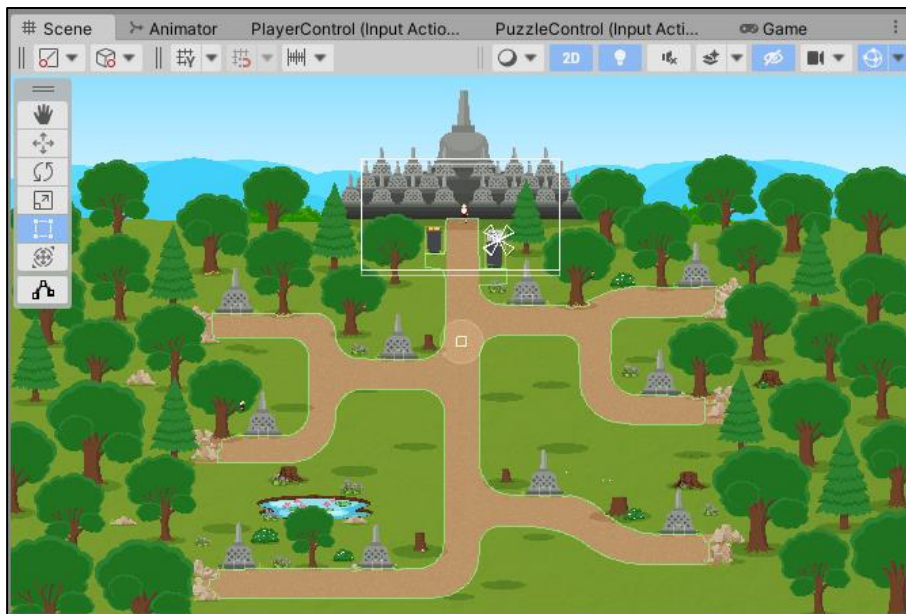
The first part that was created was a splashscreen display. The Splashscreen was created using the features provided by Unity in the File > Build Settings > Player Setting > Player > Splash Image section. Select the logo you want to display and set the duration of the logo, to see the results you can by pressing the Preview button.

The first step is to create a new scene in Unity and then name the scene as MainMenu. Next, arrange the layout according to the wireframe that has been created. Add backgrounds, logos and buttons to the Hierarchy by right clicking > UI > Image and right-clicking > User Interface > Button. When adding Image and Button, it will automatically make Canvas the area that will be visible on the screen display later. Configure Canvas so that it can later adapt to different smartphone screens, configure it in the Inspector > Canvas section. Arrange the logo and button according to the wireframe and the button display by replacing the Source Image on Inspector with the button asset that has already been created as in **Figure 8**.



**Figure 8.** MainMenu Scene Creation Process.

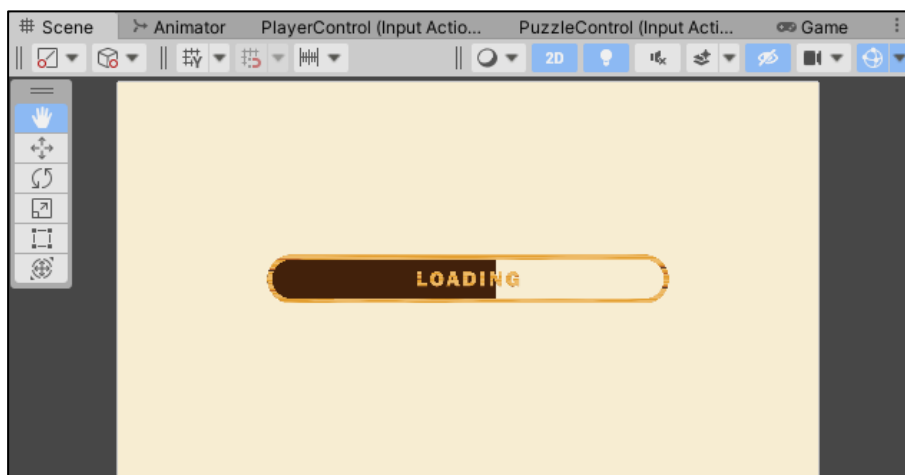
Scene Main Game is the core of this “Petualangan Aksa” game application. Therefore, the creation is the longest and most complex of the scenes or other parts. Create a new scene with the name MainGame and then add Image and arrange Canvas the same as before. Add the Map background to the Hierarchy and then create a GameObject to organize the Collider that will later be used as a trigger. Rename the Gameobject to TRIGGER and re-create GameObjects in it with the name TriggerBackground. Add Edge Collider 2D to the Inspector. After that, arrange the Collider to follow the path on the background so that the Player can only run according to the route that has been created as in **Figure 9**.



**Figure 9.** Creating a 2D Edge Collider on the Background.

The last part created is Loading Screen. Loading screen is used as an animation loading bar that serves as a transition between scenes in the Adventure of the Axis game. The first step is to create a new scene called LoadingScreen. In the Loadingscreen scene there are three types

of images that are used: background, Loading and Loading Fill. Add 3 images to make the previous 3 images and arrange them as in **Figure 10**.



**Figure 10.** Loading Screen Creation Process.

After the entire scene has been created, next is Build the game. To build the game you can by File > Build Settings, make sure all the scenes you want in Build are in Scenes In Build. Make sure the settings like Platform match the desired.

### 3.5. Testing

At this stage, the game will be tested to assess its performance by involving two stages of testing, i.e. alpha testing or validity testing and beta testing to observe user responses to the game that has been created. Alpha testing is carried out by material experts and media experts, while beta testing involves the participation of the students.

#### a. Alpha Testing - Material Validation

The material validation test was conducted by Mrs. Umi Mungadah, S.Pd as teacher of Java subjects in 4th grade at SDIT Bina Insan Kamil Sidareja with the results in **Table 3**.

**Table 3.** Result of Alpha Testing - Material Validation.

Aspect	Number of Details	Maximum Score	Scores Achieved	Percentage
Material	7	35	34	97,14%
<b>Average</b>				<b>97,14%</b>

Based on the above material validation test results, the material aspect gets a score of 97.14%. Based upon the Alpha Test Percentage category, the final score of the “Petualangan Aksa” game gets a rating of 9.14% and gets the category “Very Worthy”.

#### b. Alpha Testing – Media Validation

The media expert validation test was conducted by Mr. Hendriyana, S.T., M.Kom as a lecturer in the Software Engineering (RPL) study program at UPI Cibiru Campus. The material validation tests were conducted directly in the RPL prodi room with the results in **Table 4**.

**Table 4.** Result of Alpha Testing - Media Validation.

Aspect	Number of Details	Maximum Score	Scores Achieved	Percentage
Navigation	4	20	17	85%
Media Display	5	25	22	88%
Content Presentation	3	15	14	93,33%
<b>Average</b>				88,77%

Based on the above media validation test results, the navigation aspect gets a score of 85%, the media display aspect gets score of 88% and the presentation aspect of the material content gets a rating of 93.33%. The final value or average value obtained is 88.77%. According to the Alpha Test Percentage category, the “Petualangan Aksa” game gets the category “Very Worthy”.

c. Beta Testing

This beta test was carried out to students of the 4th grade at SDIT Bina Insan Kamil Sidareja to get student responses about the “Petualangan Aksa” game. As for the number of students who are respondents is as many as 23 students with the results in **Table 5**.

**Table 5.** Result of Beta Testing.

Aspect	Number of Details	Maximum Score	Scores Achieved	Percentage
Ease of use	4	460	406	88,26%
Media Display	3	345	306	88,69%
Content Presentation	3	345	306	88,69%
<b>Average</b>				88,54%

Based on the media validation test results above, the user-friendliness aspect received an average score of 88.26%, the media display aspect received a rating of 88,69% and the material presentation aspect obtained a score of 8.69%. The final or average value of the achieved value was 88.54%. According to the Alpha Test Percentage category, the Axis Adventure game received the category “Very Worthy”.

**3.6. Distribution**

At this stage, the products that have been developed are delivered or distributed. The Aksa Adventure Game was submitted to SDIT Bina Insan Kamil Sidareja through Mother Umi Mungadah, S.Pd to be used as a Java character learning medium. The application was presented in the form of an.apk file stored on Google Drive.

**4. CONCLUSION**

The "Petualangan Aksa" game is designed and built using the Multimedia Life Cycle Development (MDLC) method through six stages: Concept, Design, Material Collecting, Assembly, Testing, and Distribution. In the Concept phase some basic concepts are created about the product to be built. At the Design phase includes the creation of the material drawing, flowchart, and wireframe of the “Petualangan Aksa” game. Next in the Material

Collecting phase it includes the collection of material in the game creation. After that it goes into the Assembly phase which includes the game making phase using Adobe Illustrator, Unity 3D and Visual Studio Code software. After the game is built, then goes to the Testing or testing phase. In this phase two tests are carried out: alpha and beta testing, alpha testing by material validators and media experts while beta testing by 4th grade students of SDIT Bina Insan Kamil Sidareja. The final product of this study is an Axis Repetition game with a very decent.apk format and can be used as a Java character learning medium for 4th grade students.

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