Hanoman adventure game based on Android

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Abstract. The use of smartphones to play mobile games is increasingly being used by everyone from children to adults. Along with the rapid development of the game industry, game engine software is now popping up, one of which is Construct 2. Construct 2 is an HTML5-based game maker software that is devoted to the 2D platform. Games can be a medium for cultural preservation in a country. One of them is Indonesian culture that needs to be preserved is wayang culture. This adventure game will raise a cultural puppet character named Hanoman, Hanoman is a figure in the form of a white monkey who acts as a character in helping Rama to save Shinta. This Hanoman adventure game in carrying out missions on each level will face the enemy characters who must be defeated to be able to open the next level. In this game, there are 3 levels where each level has different difficulties so that it can provide challenges for its users.

1. Introduction
A smartphone is a communication tool that is not only used for telephones or sending text messages but also has other supporting features such as games, music, internet, and others. The use of smartphones to play mobile games is increasingly being used by everyone from children to adults. Games are all forms of activities that require thinking, intellectual agility and achievement of certain targets. [1]. Games are also a participatory, or interactive, entertainment [2].

The development of the game industry in Indonesia has developed very rapidly and has various types of game variations, one of which is an Android-based game. The number of game applications on smartphones with the Android operating system because it provides an open platform for developers to create their own applications. Compared to other operating systems on smartphones, the Android operating system most supports developers to create their own applications [3].

Creating a game application requires game engine software to make it easier to build a game. The game engine is the nuts and bolts that are responsible behind the making of each video game. Starting from graphic arts to mathematical calculations that determine each frame on the screen is determined by the engine. Starting from the rendering process - the process of displaying graphics on the screen, and integrating control methods and rules that will be applied in the game - engine is something that is made by developers to make a game [4]. The game engine software that will be used in building Construct 2, which functions as a powerful and very user-friendly application. This application has been around for more than 5 years, has been downloaded more than 3.5 million times. And has an active community and responsive development team. The output from Construct 2 can also be exported to desktop PCs, Macs and Linux using Node Webkit. [5].

Games can be a medium of cultural preservation in a country, one of which is an adventure game. The adventure game is an adventure game that tells the journey of a character [6]. This adventure game will raise a puppet culture figure named Hanoman, who is a tangible white ape character who acts as a character in helping Rama to save Shinta. Currently, there is a game that raises the character.
of the Hanoman puppet, but the game is still very simple in appearance, action, obstacles and there is no element of cultural delivery in it. With the several Hanoman themed adventure games above, a better Hanoman adventure game will be developed in which there are attractive designs, more challenging games and cultural elements. This Hanoman Adventure Game consists of 3 levels, namely wilderness, Sempati beach, and Alengka royal park in which there are enemy characters that must be defeated to complete missions at each level.

2. Method

2.1 Multimedia Development Life Cycle (MDLC)

This research method in building Android-based Hanuman adventure games uses the Multimedia Development Life Cycle (MDLC) method, which consists of 6 stages: concept, design, material collecting, assembly, testing, and distribution [7]. Figure 1 is the MDLC stages as follows:

![Figure 1. Multimedia Development Life Cycle (MDLC)](image)

2.2 Flowchart Game

Builds an Android-based Hanuman adventure game requires a flowchart to guide the game workflow before the game will be built and implemented. Flowchart system workflow when the user in playing the game Hanuman Adventure, starting from the user taking action by pressing the Start button then the initial level will appear to the final level. The following picture is a flowchart:

![Figure 2. Flowchart of Hanoman adventure game](image)
2.3 Design Character

In the process of designing the characters that become the reference is the story script which then records the needs of any character that will appear in the story. In this case, the writer is in charge of making eight central characters. After knowing what characters will be made, the next process is to study the character description either through literature, existing studies from similar films or historians. After knowing the description of each character, the next process is to determine the appropriate archetype to strengthen the character's personality [8]. The types of character design in building a game are as follows [9]:

1. Player Character
   a. A player or several players control the character.
   b. In some games one player controls one character, several one players control the character (strategy, sport)
2. Non-Player Character
   a. Divided into allies, facilitators, and decorations
   b. Showing limited reaction, but generally not hostile except in provocation
   c. Examples of sports: cheerleaders, judges, announcers, etc.
3. Enemies
   a. Divided into rivals, aggressive enemies, and passive elements
   b. An NPC that prevents players from winning the game
   c. The enemy can be smart and cunning, or aggressive
4. Finally Boz
   a. Included in the character of enemies
   b. Has a strong character, smarter and more difficult to beat.

3. Result and Discussion

In building an Android-based Hanuman adventure game with the Multimedia Development Life Cycle (MDLC) method which will be explained in detail at each stage of concept, design, material collecting, assembly, testing and distribution.

3.1 Concept

This Hanoman adventure game is an adventure game that emphasizes the player's reaction. Adventure while fighting is an action in this genre. The blow-kick action, the use of swords and several other tools become entertainment for players. Opponent players can be anything and usually quite a lot. Judging from the actions that are quite a lot this requires quite a lot of control too [10]. This game has a 2D action element that tells the story of a puppet character, Hanoman, who was assigned to rescue Dewi Shinta who was kidnapped by Rahwana. In building Hanoman adventure games using Construct2 which is a game engine to create game applications especially for 2D5 based HTML5 games, which in calling functions in Construct 2 only uses the Events settings that have been provided. Events are choices of actions and conditions that will become lives in the game and the game can run as we want [11].

The storyline of this adventure game does not use the high score system because this adventure game uses a story or story model in which there are missions at each level. This adventure game has 3 levels namely wilderness, Sempati beach, and Alengka royal park. At the beginning of opening the Hanoman adventure game will display loading, when loading is complete it will be directly connected to the main menu display (main menu) main menu display there are several buttons namely the start button, how to play, settings, and exit. The button starts directing the player directly into the game level that is started by the prologue scene.

3.2 Design

3.2.1 Use Case Diagram

Use Case diagrams are used to make it easier to design applications because the usecase diagram is clearly visible when the user performs an application, the following is a Use Case diagram in the game Hanoman Adventure:
3.2.2 Storyboard

Storyboard illustrates a scenario that is made in stages, that is every scene in the game. This storyboard will explain the composition of the game material created. The following are the scene tables in the Hanoman Adventure game:

| Scene | Menu Name | Information |
|-------|-----------|-------------|
| Menu  | Playing Menu | Display the main menu of the Hanoman Adventure game |
| Name  | How to play | Showing how to play the Hanoman Adventure game |
| Information | The mission of Level 1, Level 2 and Level 3 | Featuring the main actor Hanoman to be able to complete each mission traversed from scenes level 1, level 2 and level 3 to save Dewi Shinta. |

3.2.3 Design Character

The process of character design in Hanoman adventure game is made with the characters in the direction of the anime design character if the original character of the puppet will be less interesting because the character will look old-fashioned. Anime is a key part of popular visual culture. In the midst of the huge role of the mass media (society) in Indonesian society, anime and manga become an inseparable part of people's lives which are currently very visual. Anime plays an important role in the formation of global mediascape, both print and electronic [12]. Next is the character design of the Hanoman adventure game:

3.2.3.1 Main Player Karakter

The Hanoman Adventure Game uses one main character, Hanoman, who is a clever, strong, and clever white ape. Hanoman characters are made as attractive as possible so that they can be accepted by all ages, both children and adults. (Figure 4) is a Hanoman character design in the Hanoman Adventure game:
3.2.3.2 Non-Playable Character (NPC)

NPCs are characters that cannot be played by users. In the Hanoman Adventure game, there are two NPCs whose role is to provide information to the user. The NPCs are ascetics, Sempati and Dewi Shinta. Here is an NPC in the Hanoman Adventure game. Next is the NPC character design:

![Figure 5. Design of Non-Playable Character](image)

3.2.3.3 Enemy

The enemy is a character whose role is to prevent the user from achieving goals in a game. In the Hanoman Adventure game, there are five types of enemies namely Archer, Orc, Troll, Dragon and Knight. Here are pictures of enemies in the Hanoman Adventure game:

![Figure 6. Design of Enemy Character](image)

3.2.3.4 Final Boss

The final boss is the boss who is near the end of the game, with the completion of the storyline the game usually follows victory in battle. The final boss in this Hanoman Adventure game is Ravana. Rahwana is the king of the Alenga kingdom who has a red body figure and long hair. Rahwana has a weapon in the form of a deep red sword called the Chandrarahasa sword. The character Ravana is made as attractive as possible so that it can be accepted by all ages both children and adults. (Figure 7) is a Hanoman character design in the Hanoman Adventure game:

![Figure 7. Design of Rahwana Character](image)

3.3 Material Collecting

Material collecting is the stage used to collect materials according to the needs carried out. The materials needed are as follows (Table 2):
Table 2 Material collecting

| Game Ingredients | Type                  |
|------------------|-----------------------|
| Text             | Fellowmaiden, Pristina, Impact |
| Image            | Button, UI, Sprite, Parallax, Tileset |
| Sound            | Ogg, Wav              |

3.4 Assembly

The assembly stage is the stage of making all objects or multimedia material. Making an application based on the design stage, such as storyboards, flowcharts, navigation structures as follows:

3.4.1 Scene Menu

The Scene Menu will display the main menu in the Hanoman Adventure game which helps the user to start the game consisting of start, how to play, settings, and game exit buttons. Here (Figure 8) is a picture from the scene menu:

![Figure 8. Scene Menu](image1)

3.4.2 Scene How to Play

This scene serves to show the user how to play the Hanoman game. It can be seen in Figure 9 that in this scene will display a dialogue box instructions on how to play the Hanoman Adventure game and there is a cross button to close the dialogue box.

![Figure 9. Scene how to play](image2)

3.4.3 Scene Game Level

The game level scene is a scene in which there is a mission that Hanomun must complete to find the whereabouts of the Goddess. At each level that will be taken to have different difficulties in completing its mission. Each can complete the mission at each game level, it will be able to know the whereabouts of the Goddess Shinta. In the left corner, there is a picture of the health bar and manabar that indicate the life and indication of the style of the Hanoman. If Healthbar reaches zero then Hanoman will repeat from the beginning of the
Scene level being pursued. Manabar serves as an indication of the style, if Manabar is full then Hanoman can release a style by pressing the shoot button. In this scene there are 8 buttons namely pause, mute, exit, right, left, A button, B button and Shoot button.

![Figure 10. Scene Game Level](image)

3.5 Testing
At this stage the black box method is tested for functions in the game by running each menu and button to see whether there are errors or not. Table 3 shows the results of the black box testing:

| Testing Name              | Input                          | Output                              | Status |
|--------------------------|--------------------------------|-------------------------------------|--------|
| starting the game        | press the start button         | starting game                       | ok     |
| how to play the game     | press the how to play button   | display the how to play dialog box  | ok     |
| settings                 | press the setting button       | display the setting dialog box      | ok     |
| mute sound               | push the mute button           | sound does not appear               | ok     |
| exit game                | push the exit button           | exit the game                       | ok     |
| player movement          | push the right button          | player moves to the right           | ok     |
| player movement          | push the left button           | player moves to the left            | ok     |
| player movement          | push the ‘a’ button            | player jumps                        | ok     |
| player movement          | push the ‘b’ button            | player hits                         | ok     |
| player movement          | push the kick button           | player make a move/power            | ok     |

3.6 Distribution
At this stage, the Hanoman Adventure game project has been completed then the build process is made into a .apk file (android file), the Hanoman Adventure game is ready to be published for users.

4. Conclusion
The results of research carried out in building Hanoman adventure games with the game engine Construct 2 will make it easier to make the game look and very user-friendly and in making Hanoman adventure game characters adopt characters into anime designs, with anime character designs able to attract the attention of many people from among children and even adults so that this game application will be more interesting and fun to play. This game is included as an adventure genre game that elevates puppet characters in Indonesian culture. With this game in addition to playing also in it can provide elements of cultural delivery, in the form of Hanoman figures who help
Raja Rama to find Goddess Shinta who has been kidnapped by King Rahwana. The storyline at each level of the game is made according to the story of Hanoman's character searching for Dewi Shinta.

References
[1] A. Ismail, *Education Games* Yogyakarta: Pro U Media, 2009.
[2] A. Rollings, and E. Adams, *Game Design*. USA: New Riders Publishing, 2003
[3] H. Syariati, *Makalah Sistem Operasi Android* Kuningan: Fakultas Ilmu Komputer Universitas Kuningan, 2012.
[4] W. Goldstone, *Unity Game Development Essentials*. Birmingham: Packt Publishing Ltd, 2009
[5] L. Stemkoski, and E. Leider, *Game Development with Construct* Springer Science New York, 2017
[6] T. Dillon, *Adventure Game for Learning and Story Telling*, Future Lab the UK, 2005
[7] I. Binanto, *Multimedia Digital Dasar teori dan Pengembangannya* Yogyakarta: Andi, 2010
[8] C. Boeree, G. Carl Jung, *Archived from the original* on 6 February 2006. [Accessed: 09-Sep-2019]
[9] L. Pardew, *Beginning Illustration and Storyboarding For Game*, Thomson Course Technolog PTR, 2005
[10] I. C. Sibero, *Langkah Mudah Membuat Game 3D*, Mediakom Yogyakarta, 2009
[11] Scirra, *Construct 2* http://www.scirra.com. [Accessed: 09-Sep-2019]
[12] M. William, *Japanese Visual Culture*, New York: M.E. Sharpe, 2008