

# The 2nd Conference on Management, Business, Innovation, Education, and Social Science (CoMBInES)

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## DESIGN AND DEVELOPMENT 2D GAME “PERANG GERILYA JENDERAL SUDIRMAN” USING GAME DEVELOPMENT LIFE CYCLE METHOD

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### ABSTRACT

Video games is used mostly for entertainment, but video games also can be used for learning it can make the player follow a story while playing. Indonesian have many history and heroic story however many Indonesian people already forgotten what is the hero do on history of Indonesian to deserve claim a title of Indonesian hero, so because of that author produce a game that tell everyone one of Indonesian history and heroic story named “*Perang Gerilya Jenderal Sudirman*” that can help to remind them. This story is about Indonesian Hero *General Sudirman* and the unity of Indonesian people to fight back against enemy Holland. This game is created using unity and C# Programming Language. Unity is a game engine that help developer to create the game and for C# is for developer to create function or logic for the game. This Research using GDLC (Game Development Life Cycle) Method. GDLC is a method process stages of game development that consists initiation, pre-production, production, testing, beta, release. By Creating this game the author hope this game can be release and help the people intends to learn the history and heroic story of General Sudirman and the unity of Indonesian people fighting the invader through game.

**Keywords:** *Video Games, Indonesian History, General Sudirman, Unity, C#, GDLC*

### INTRODUCTION (SHEADING1)

Game is something that can be play with certain rules that can result win or lose, with main purpose for refreshing or entertainment. Game also can be as learning media for learning a knowledge like learning of history. While video game is electronic game that involving with user interface that creating a visual feedback on a video device like on tv screen or monitor pc (Kurniawan et al., 2020). Video games is mostly there is many kind genre of game that let us see rough picture of the game (Kurniawan et al., 2020). On this research the genre game author produce is a action-adventure games. NPC (Non Player Character) is supporting character on the game. Usually this characters have a duty to help to progress a game story and a trigger of a quest on the game (Kurniawan et al., 2020).

Indonesian have many history and heroic story, however many Indonesian easily

forgotten what is the hero do on history of Indonesian to deserve claim a title of Indonesian hero, so because of that we produce a game to tell everyone one of Indonesian history and heroic story named “*Perang Gerilya Jenderal Sudirman*”. This research have a uniqueness by design and develop this game using Unity Engine and GDLC method approach to make it easier to create the game General Sudirman guerilla warfare story.

GDLC is used to improve the video game quality of the game being produced. GDLC is a game development process that applies a iterative approach that have 6 development phase, start from initiation, pre-production, production, testing, beta, release (Krisdiawan & Darsanto, 2019). Hopefully this game can be help the people intends to learn history and heroic story of General Sudirman and the unity of Indonesian people.

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## LITERATURE REVIEW

### Related Research

There are many various researcher create a game using unity and using GDLC method, one of the researcher using unity as the game engine is (Kurniawan et al., 2020)'s research, where his research is create a RPG game called "Mari Mengenal Provinsi di Indonesia". This game main focus is to tell the player more about the Indonesian Province.

Another research done by (Chusyairi et al., 2020) is called "Game Gandrung Stories Untuk Edukasi Kebudayaan Menggunakan Metode GDLC". This research is creating a RPG games with RPG Maker and GDLC method. This game is called "Gandrung Stories" is main objective of the research is to give knowledge about culture about *tari gandrung* to new generation with interesting and interactive method.

Another research done by (Zharfran et al., 2021) is research called "The Bandung Geology Museum Educational Game Module" and the game called "Geostone", this game is using unity 3d and GDLC method on the process. The research objective is to create a game for learning mineral rocks on Museum Geologi Bandung.

## RESEARCH METHODOLOGY

The following is the research design flow:

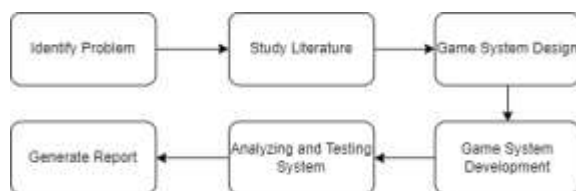


Figure 1. Design Flow

### 1. Identify Problem

On Identify Problem, author identify a problem on a background, problem formulation, and research objective and benefits.

### 2. Study Literature

On study Literature stage, author gather book or journal use for reference on the process of designing and developing the game.

### 3. Game System Design

Next step author will do storyboard and scenario game before developing the game so when doing developing the game got much easier.

### 4. Game System Development

On this stage author developing the game by using c# and unity engine. the author implementing the storyboard and scenario to the game.

### 5. Analyzing and Testing System.

On this stage author will analyzing and testing the game to see whether the game is working like author intended. After that author will do beta testing to let other people testing the game and author will analyze the issue if there is from the feedback.

### 6. Generate Report

After finishing the analyzing and testing the game system, author will summarize all the work on this research to generate a report.

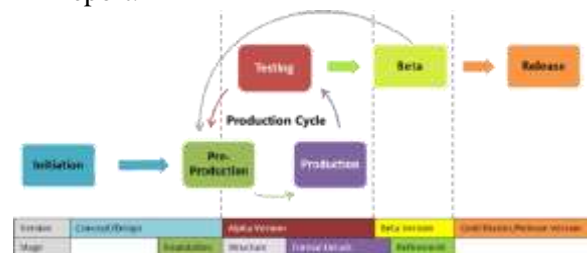


Figure 2. GDLC

The following are some of techniques used in system development:

### 1. GDLC

GDLC is the method the author will use on this research. GDLC is method used for Developing a game from start to end. This method start from initiation stage where creating an idea and concept of the game.

#### a. Initiation

On this stage author will decide what kind of type game, gameplay, the game objective, target audience, platform that will use for playing the game.

#### b. Pre-production

On pre-production stage is where author creating game design by creating gameplay, flowchart, usecase diagram, activity diagram, and storyboard.

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- c. Production.  
After finishing pre-production stage, on production stage author will perfecting the game design and prototype that being made on pre-production.
- d. Testing  
On this stage author need to do a testing on the prototype that already being build to check the game is already work like author wanted.
- e. Beta  
After the game is produced, it doesn't mean being accepted by the masses, so on this stage there is game testing to detect error or bug and got a feedback from other people. This test only doing once so it can release faster. This stage is outside production cycle, also this testing can result a redo a from start of production cycle again.
- f. Release  
After the game is finish developed and succeed the test on beta it conclude that the game is ready for release.

## 2. Activity Diagram

The activity diagrams are compiled as following below:

### a. Start Game Activity Diagram

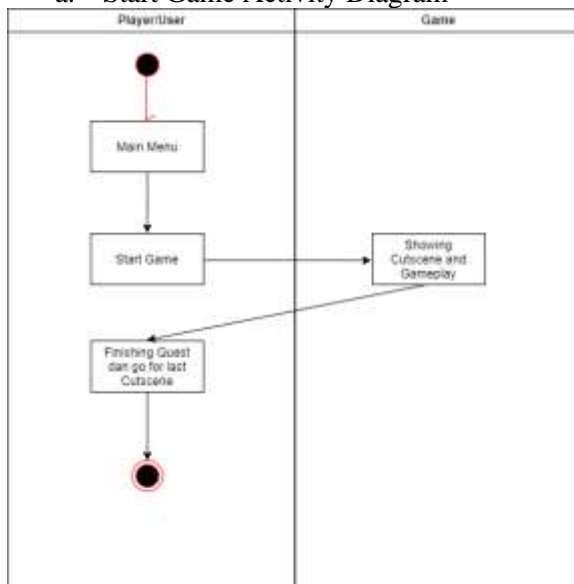


Figure 3. Start Game Activity Diagram

### b. Load Game Activity Diagram

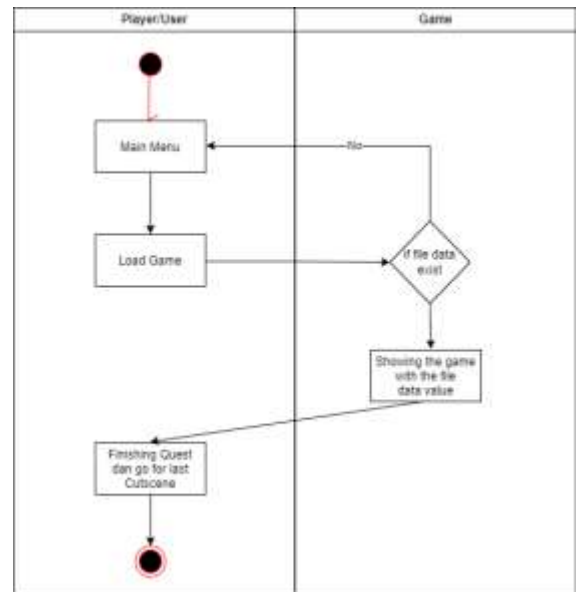


Figure 4. Load Game Activity Diagram

## RESULT AND DISCUSSION

Next Step to analyze and formulate

user

### 1. Initiation

Initiation is where the starting phase of GDLC from the initiation where need to think of idea for the game. When creating a game is very critical to know what kind of game to create. The following is a list of Initiation phase result that has been collected:

Table 1. Planning table

Question	Answer
What kind or genre of game you will make	The game "Perang Gerilya Jenderal Sudirman" is an action-adventure game
How is the gameplay	Player communicate with NPC, fight with General Sudirman by helping General Sudirman finish the guerilla warfare mission. Player use weapon to fight

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	enemy. There is a inventory for player so player can gather item and use it on the heat of battle
Who are the characters	Player, General Sudirman, NPC, Enemy
Is it 2D or 3D	2D
How the story begins	Story begin from a cutscene of summarize story of what happen end of December 1948 and to summarize story how Holland is attacking Indonesia city called Yogyakarta and rule the city, then after all the cutscene it will direct to player cutscene.
What's the target platform	Platform target is PC
What kind of technology/engine you will use	Unity Engine and C#

## 2. Pre-production

The pre-productions is where the planning the design of the game. By planning this design game it got easier to develop the game. This following are the planning game design for this research:

### a. Usecase Diagram

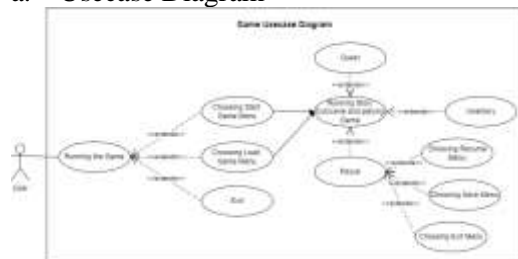


Figure 5. Usecase Diagram

### b. Flowchart

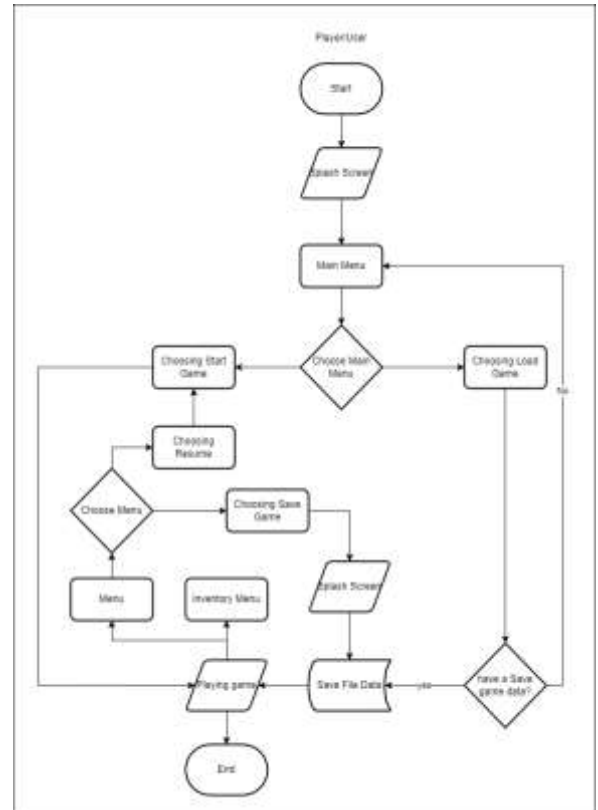


Figure 6. Flowchart

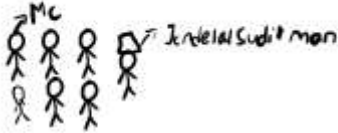




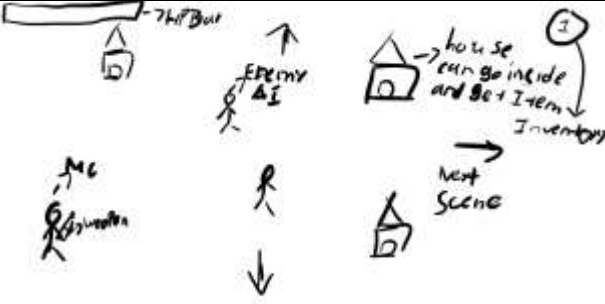
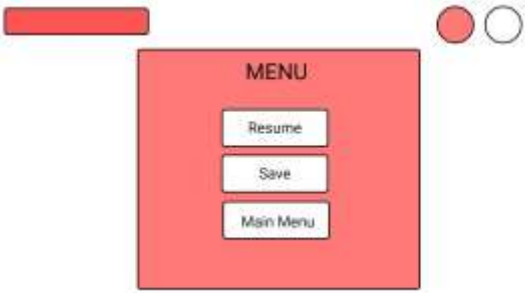
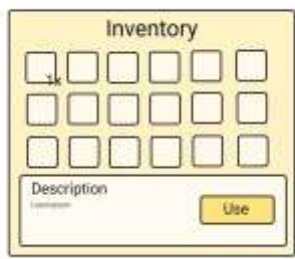
### c. Storyboard

Table 2. Storyboard

<p><b>Image</b></p> <p>Jenderal Sudirman Guerrily Warfare</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 100px;">Start</div> <div style="border: 1px solid black; padding: 5px; width: 100px;">Load Game</div> <div style="border: 1px solid black; padding: 5px; width: 100px;">Exit</div> </div>
<p><b>CUTSCENE</b></p> <div style="display: flex; justify-content: space-between; align-items: center; height: 100px;"> <div style="font-size: 2em;">↓</div> <div style="text-align: center;"> <p>March 1st 1949</p> </div> <div style="font-size: 2em;">↓</div> </div>

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 <p>Name</p> <p> Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book.</p>	
 <p>Menu   3.</p> <p>Inventory</p>	<p>3. Production</p> <p>During production stage author need to complete the game design from pre-production. There is critical thing before we do create a game, we need to know what is our game mechanic. Let's see the Guerilla Warfare of General Sudirman game mechanic, the mechanic is where the player must follow General Sudirman to fight against holland Player have a HP where if the HP is 0 that means you wipe out and need to start from the checkpoint and continue again but on the long way you can also pick item to help you on the journey, then player must follow the quest from General Sudirman so if Player finish the Quest there is a new cutscene and the stories continue. The player win the game if the story is finish. This stage also include:</p>
	<p>a. Creating Asset Game</p> <p>On production need to creating the asset design of the character and also the tile so it can make it easier to create world building for the game. The following is created asset:</p>
	
	

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Figure 7. Player



Figure 9. NPC

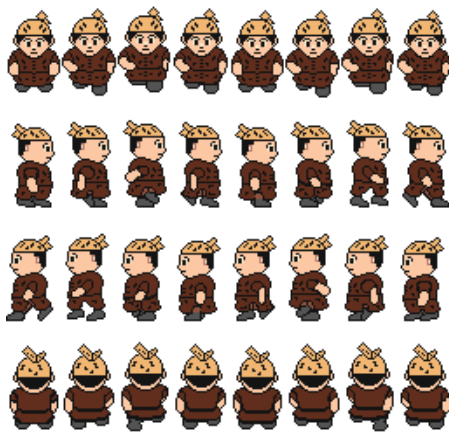


Figure 8. General Sudirman

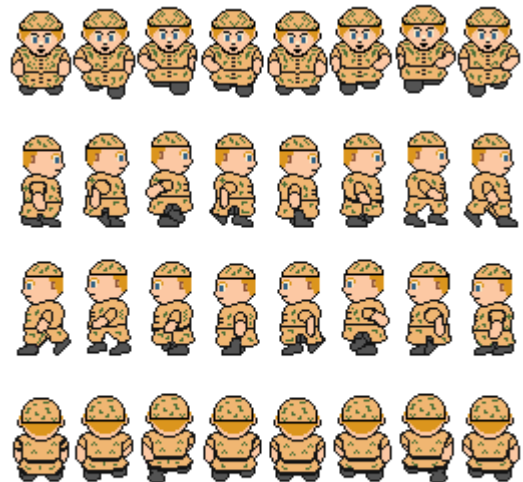


Figure 10. Enemy



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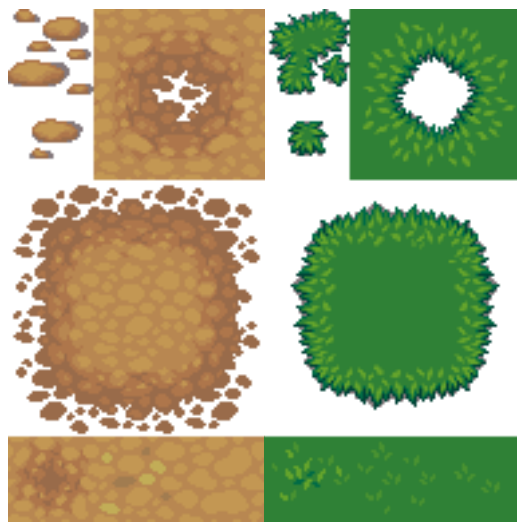


Figure 11. Ground Tile



Figure 12. House

b. Adding the Asset

The asset of character design, tile that already made it need to be added to unity.

c. Creating the Game

On last production last step will using Unity Engine and C# for creating the game. The following image is the game that made by author using Unity Engine and C#:



Figure 13. Main Menu



Figure 14. first Cutscene

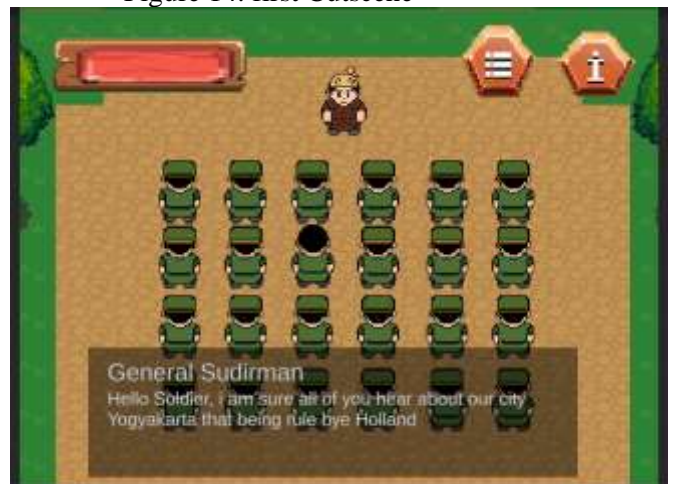


Figure 15. General Sudirman Dialog and Cutscene



Figure 16. Killing Enemy using Guerilla Tactics

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Figure 17. Menu

Figure 18. Inventory

#### 4. Testing

For a game we need to do some testing. Testing is very useful to discover a bug or error from the game also can check the difficulty of the gameplay so the player won't have to suffer because game too hard to beat. Author testing will use blackbox testing and the testing start from install the game. here is following blackbox result testing:

Table 3. Black Box Testing

No	Name	Expected Output	Validation		Score
			Yes	No	
1	Start Button	Direct To Cutscene	Yes	-	100
2	Load Game Button	Direct to the game and the value of all object is the same as the save one	Yes	-	100
3	Exit Button	Close the game application	Yes	-	100
4	Inventory Button Icon	Pop a modal of Inventory Menu	Yes	-	100
5	Use (On Inventory Menu)	Running the function depends on the item use. Testing on using the orange, the orange number is	Yes	-	100



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		reduce by 1 then player heal hp			
6	Menu Button Icon	Pop up a modal of the menu	Yes	-	100
7	Resume Button (Menu)	Pop up disappear then continue playing the game	Yes	-	100
8	Save Button (Menu)	Saving data and create the save data	Yes	-	100
9	Quit To Main	Direct to the main menu	Yes	-	100
10	Pressing Z Key	Player attacking enemy depend on what item it use	Yes	-	100
11	Pressing X Key + (Top Key, Bottom Key, Left Key, Right Key)	Player dash to the key it direct if not it dash to depends where the player face	Yes	-	100
12	Top key	Going up	Yes	-	100
13	Bottom Key	Going down	Yes	-	100
14	Left Key	Going left	Yes	-	100
15	Right Key	Going right	Yes	-	100

## 5. Beta

This Beta testing is to know are the system is working well or not. This testing is doing with 10 college students from Batam, 5 out

Table 4. Questionnaire

NO	QUESTION	SCORE		
		Good	Ok	Not Good Enough
1	Design Character	60%	30%	10%
2	World Building	70%	30%	0%
3	Game Control	70%	20%	10%

of 10 not from game lover, and 5 more people is a game lover. The following is the result of the beta testing for “Perang Gerilya Jenderal Sudirman”:

4	Game Information	80%	20%	0%
5	Quest	70%	20%	10%
6	Cutscene	70%	30%	0%
7	Game is interesting	70%	30%	0%

## 6. Release

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By finishing all the stage on GDLC start from initiation to beta then it means the Game is ready to publish or release for PC.

## CONCLUSION

After Designed and Developed 2D Game “Perang Gerilya Jenderal Sudirman” using GDLC Method and Unity Engine so author conclude that GDLC is really helping to make the design and develop game much easier. By using GDLC method it track the bug and error much easier so it doesn’t get many issue when release the game on public. Furthermore it make people who want to learn how the hero General Sudirman heroic win against the holland more easier and more fun.

## LIMITATION

This study is to contribute for future research of game development. The development of this game still has several flaws, from the gameplay, lack of item, and from author thought of the game need to also add a cutscene play so player can do a recap of the story.

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