Interactive Game Design for Learning of United Nusantara in the Majapahit Era

Liliana[1], Erandaru[2], Gregorius Satia Budhi[1], Silvia Rostianingsih[1]

1) Industrial Technology Faculty, Informatics department, Petra Christian University, Surabaya, lilian@petra.ac.id, greg@petra.ac.id, silvia@petra.ac.id

2) Art and Design Faculty, Visual Communication Department, Petra Christian University, Surabaya, andar@petra.ac.id

ABSTRACT

Know the national history is important to develop patriotism. Nowaday, young generations have less interest on learning national history. It needs creative media to deliver the content of history to them. If history is packed as film, picture book, animation or a popular media lately, computer game, it will be easier to be learn. Observing the need to introduce Indonesian National history especially to young generation, in this research will be developed a learning scheme through an interesting media, computer game.

In designing game which adopt some important aspects in history, game play and story board plays a significant role. This game will contain three aspects socio-cultural, government and economy. These aspects are selected because represents modern Indonesia's condition. Diverse ethnic groups, archipelago country and similar economic as living support. Socio-cultural aspect will be represent by daily activities and public buildings. Governmental aspect will be represent by arrange territory and military. Economy aspect will show agriculture, trading and mining. This game is a strategy turn based game because the main goal of this game is to unity the entire island in nusantara (Indonesia).

Since every player can make different strategy, this game can yield different results. This situation limits delivering history content. Socio-cultural, governmental and economy aspect are not depend on chronology. Thus, these aspects can be represent in the game appropriately. To limit the wide area of nusantara and the long history since the first king of Majapahit until the last king, this game is limited until entire nusantara island are conquered. This time is about king Hayam Wuruk era.

Keywords: Strategy turn based game, computer game, Majapahit empire, war strategy game, game based learning

BACKGROUND

Learning national history is important for every nations. Especially a nation like Indonesia which has diverse ethnics, culture, even uses different ethnic language for daily conversation. National history will be one of few common heritages as a nation. By sharing same history, it will develop a patriotism to all its citizenz[1].

Though it is important, learning national history has some difficulties in practice, especially for young generations. It is because it involves dates and geneology of many kings or leaders[1]. Not only that matter, using a boring media also be a main reason. Text book is not an interesting media for young generations nowadays. They want some visualizations, animation, or even interactive applications such as computer game.

In the former era, computer game is developed as an entertain tool but it turns to be an effective learning media later[1],[2]. Computer game can provide a media to make an experience over a topic[3]. History has no laboratory for student. It cannot be remake or reconstruct. Computer game solves the problem by giving a simulation tool to rebuild history[4].

Many computer games with historical topic are developed lately. Generally, they only consider on war strategy, build clans and allies, and attack other clans. The main goal is get the high point, overpower a large area or many cities. Player will focus on upgrading their kingdom, defending and attacking. Some multiplayer game offer an advantage by build a friendship through cyberspace. Some other games adopt the past condition in cultivating fields, selling the product and gaining profit and develop an area. Such a game has no special goal. The main goal is maintaining and developing area.

In the past Indonesia, it has many kingdoms's history. The most popular is Majapahit. It's because Majapahit's region almost similar with modern Indonesia[5],[6],[7]. In the golden era of Majapahit, it region included Malaca in Malaysia, Singapura and the whole kalimantan (Brunei and other part of Malaysia in this time). So, Majapahit can represent Indonesia in the past. Majapahit also be chosen because the peak cultur and art through many religion statues (candi) which are stayed until now.

In this research, a historical game will be developed. This game has main goal to unity the entire nusantara Indonesia. This game will adopt socio-cultur, government and economy aspect carefuly. Even it use war strategy genre that depend on player's startegy, this game will has some milestone events based on history.

PREVIOUS WORK

In its further development, game has changed. Both game design and content[3]. From simple graphics until complex 3D environment. From just for fun be more serious game, that is a game with value such as learning content[1]-[4]. These value and content can be applied as game's rules[8]. Combining the rules based on historical mechanism and historical environment will make a game which can be used as a potential and powerful medium to deliver history content to students[1],[3].

There several element should be in a good game based learning applications. Education game as a designed experiences[3], learning goal and theory setting[1], value in designed rules[1],[8], match with the student environment and accessible also easy to use [4].

As a good game, it should has tension and time limit [9]. The virtual agent should be smart enough. These game element motivate us to develop a strategy game.

Strategy games are games that require "thinking" and "planning". Strategy games are different from other genres because the designer creates the rules and goals, but it is a gamer who decides what strategy will be used to achieve the goals and outwit opponents [9]. Strategy game is based on manipulating real condition and strategic thinking [3]. Strategy game makes the user arrange his own strategy to solve problem that be given by the artificial intelligent [3],[9] .

GAME DESIGN

In designing this game, it should consider two important things, the storyline and the game play. Storyline contains the goal also time line and virtual enemies based on history. Game play means the rules. The goal of this game is conquesting nusantara Indonesia and maintaining them under player's empire. Timeline will contain some special events such as natural disasters, uprising from colonies, and turn of the kings.

All data are used in this game are design using Object Oriented Programming scheme that shown in Figure-1. The board game contains empires and regions on a 2D map of tiles. A region contains some tiles. These regions will be enemy's, player's or none. Empires keeps data of player and enemies. Each tile of the map will be five kinds, ship whart area, resource area, field area, trading area or material area.

For a given status, this game has several types of terrain. Sea, coast, plain, forest, hill and mountain. Different terrain can built as different building. Ship whart be built on coast only, resource building can be built on a plain, field will be on forest or hill, trade building (market) can be on plain and material is on area with colored stone. Yellow stone means gold, white stone is silver, blck stone is copper[5]. Later, ship whart only can be occupied by ships, resource area cab be built as public building, field area can be fields or rice field, markets are only built on trade area, while material can be developed as a mining and industry that produces many utilities.

Empires have ships, armies, region and modals (money and food). Region is actually is some tiles under an empire's power. Ships have two kinds, trade ship to deliver comodities and warship to send troops to other islands. There are three kinds of army, archer, army using short sword (keris) and army using spear. the moving of army can be seen in a finite-state machine on Figure-2.

The game play will be start with a distinct tile and some given army and modals as shown in Figure-3. It will start in 1293 when the first king of Majapahit, Kertarajasa, opened a forest and found a bitter maja fruit (later, "bitter maja" / "Majapahit" will be the name of that area) [5]-[7]. Player has the first turn. After finishes choosing action(s), player will clicked "next turn" button to trigger enemy's turn.

Some action need more than one turn to be finished, such as deliver troops. It need one turn to move one tile. If player sends his troops far away, so it will need more than one turn, depend on the distant. If an attack is chosen, player should prepare the troop, how far the distant will determine how much food should be brought, see the function in Figure-4. Then, the player will enter a battle field, face to face. In this battle, player will arrange the troops sent before, in the area. This battle function can be seen in Figure-5.

The other job which cannot be done in one turn is colleting taxes. Empire can collect the taxes from resource tile only. One turn represents one month. The months are based on agricultural calendar. It marks the time to sow and the time to harvest[5]. All the taxes can be collect once every year. Taxes will be taken from markets, industries, trading trough importing and exporting comodities, fields and tributes from colonies[5],[6]. Different kind of taxes will be collected in different time. This means, player should collect the taxes from the right tile on the right turn.

To arrange the interface of this game, first, must be arranged the region as shown in figure-6. Then, setting the potential on each tile, such as mineral, forest, ship (trading area) and the capital of a region is marked with a statue. The complete display will look like figure-7. Figure-8 shows the battle area if player chooses an enemy's region to be his own region.

CONCLUSION

Incorporating elements of learning in a constrained game such as strategy game faces many difficulties. this game will be run by the steps taken by the player. Each different player can take different steps that cannot be limited by something like a definite history. Therefore, it is important to sort out which parts can be learned through a flexible game in terms of the sequence of events.

In this case, the design of the game which provides some insights in the governance, socio-cultural and trade is the right choice because it is not related to the chronology of history. In addition, the learning will be more interesting and easier to be understood because it no longer involves dating, genealogy and history of events in the narrative form that must be memorized.

In this research, the game is designed to adapt the events in the form of war, either attack from outside or rebellion from within the empire. Because the war itself is simulated by a player, it will be intriguing to find out the actual events in more detail.

In the future this game will be completed with smart virtual enemy. An appropriate artificial intelligent method will applied for this purpose. Especially enemy for battle area.

REFERENCES

[1] Nor A. M. Zin, Azizah J., Seng Yue W. 2009. Digital Game-based Learning (DGBL) Model and Development Methodology for Teaching History. WSEAS Transaction on Computers. Issue 2, Vol. 8. Pp. 322-333.

[2] Sebastian D., Dan D., Rilla K., Lenneart N. 2011. From Game Design Elements to Gamefulness: Defining "Gamication". Conference Envisioning Future Media Environments. Pp. 9-15.

[3] Kurt Squire. 2006. From Content to Context : Videogames as Designed Experience. Educational Researcher, Vol. 35, No. 8, pp. 19-29.

[4] Rhonda M. E., Anne D., 2012. Game-Based Learning. Educause Centre for Applied Research.

[5] Kartodirdjo, Sartono. 2003. 700 Tahun Majapahit, 1293 – 1993 : Suatu Bunga Rampai. East Java Regional Tourism Department in Surabaya.

[6] Muljana, Slamet. 2005. Menuju Puncak Kemegahan: Sejarah Kerajaan Majapahit. LkiS. Yogyakarta.

[7] Munandar, Agus Aris. 2008. Ibukota Majapahit, Masa Jaya dan Pencapaian. Komunitas Bambu. Jakarta.

[8] Yasmin B. Kafai. 2006. Playing and Making Games for Learning. Game and Culture journal Vol 1 No 1 January 2006. Pp. 36-40.

[9] Christopher A., Guy S. 2010. High-level Reinforcement Learning in Strategy Games. Proc. Of 9th Int. Conf. On Autonomous Agent and Multiagent Systems (AAMAS 2010). pp. 75-82
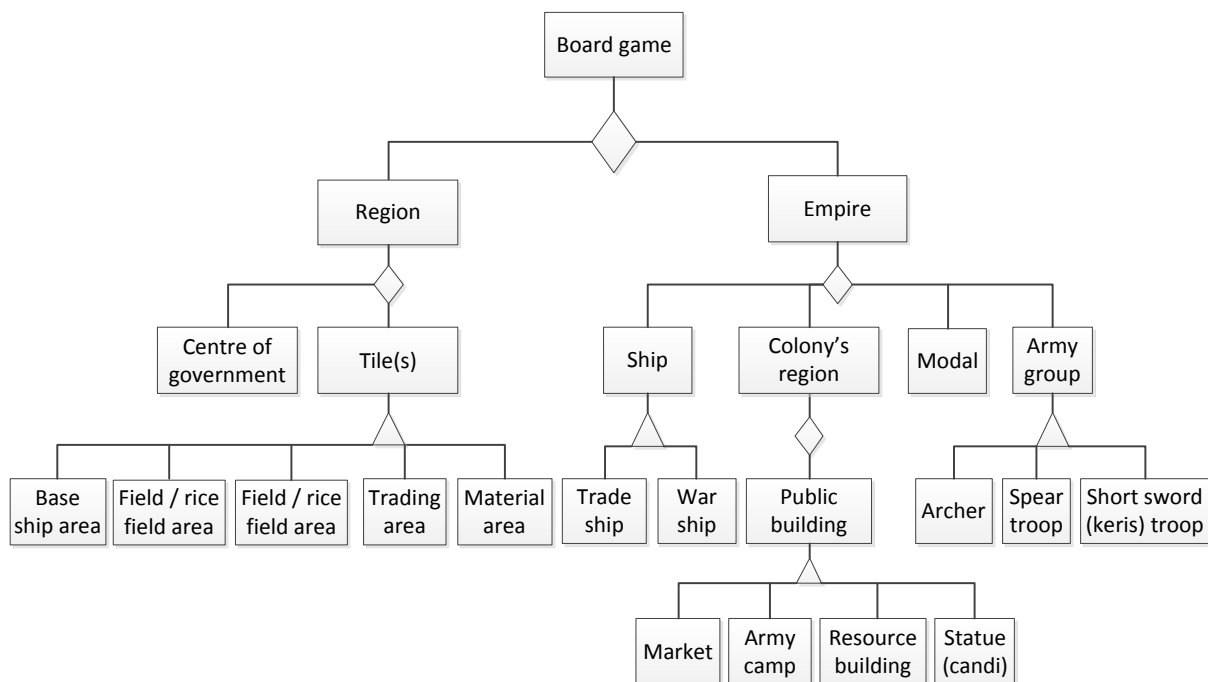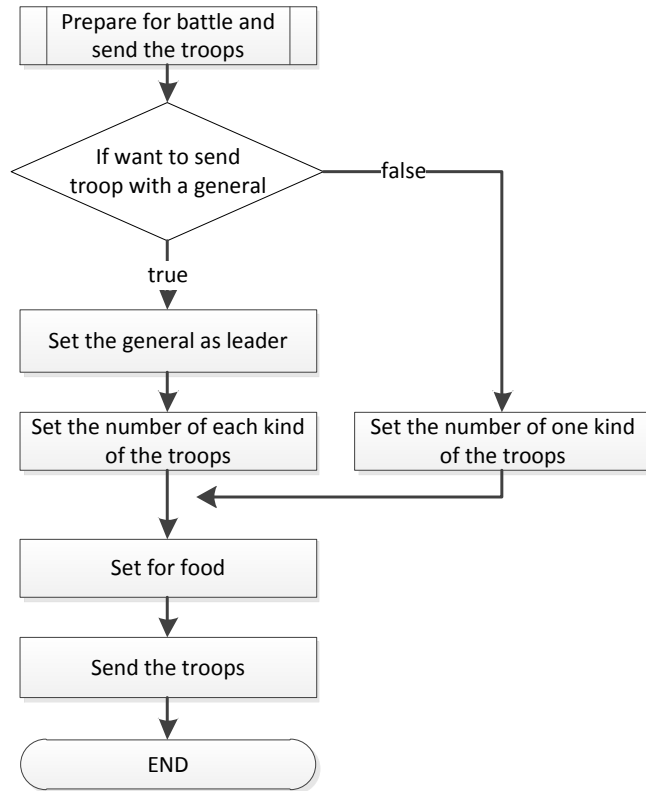
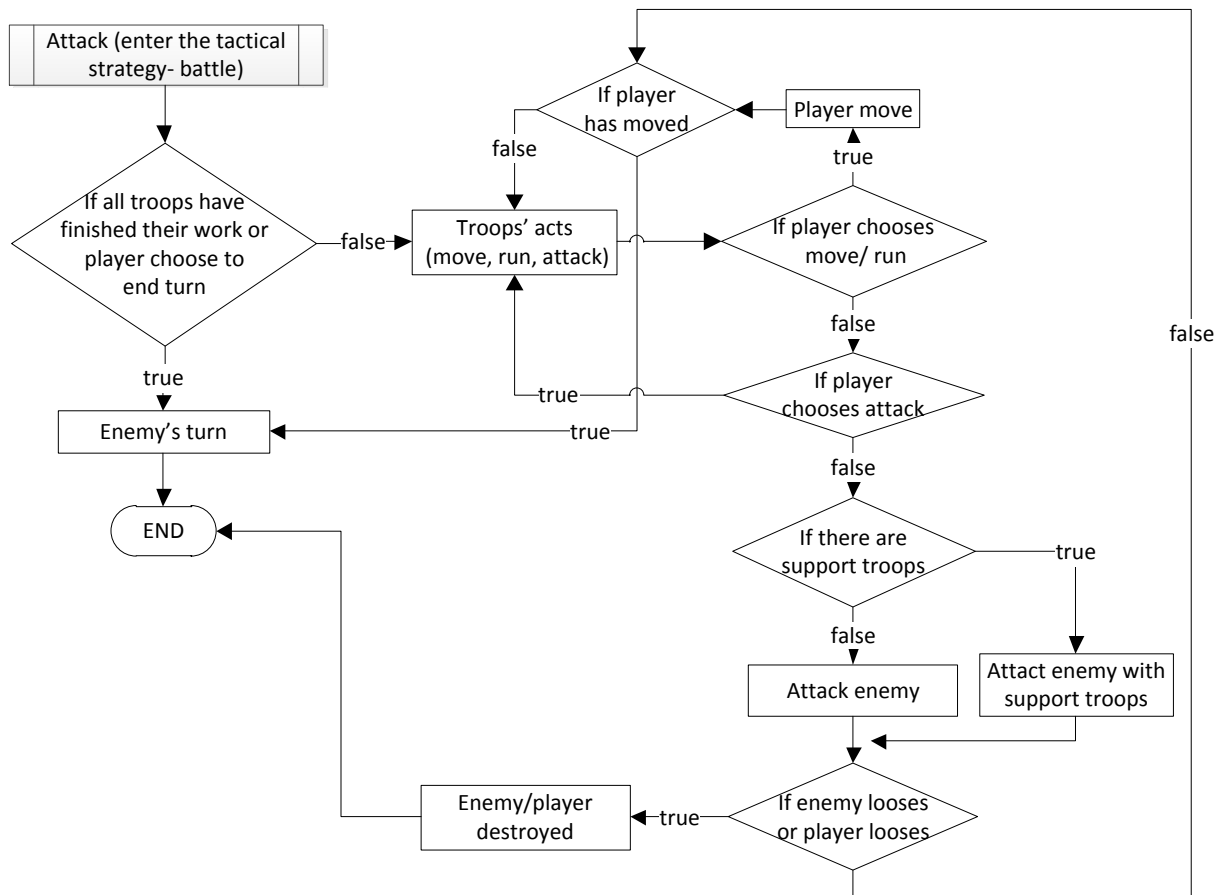**Figure-1.** Object Oriented Programming Class design relationship diagram
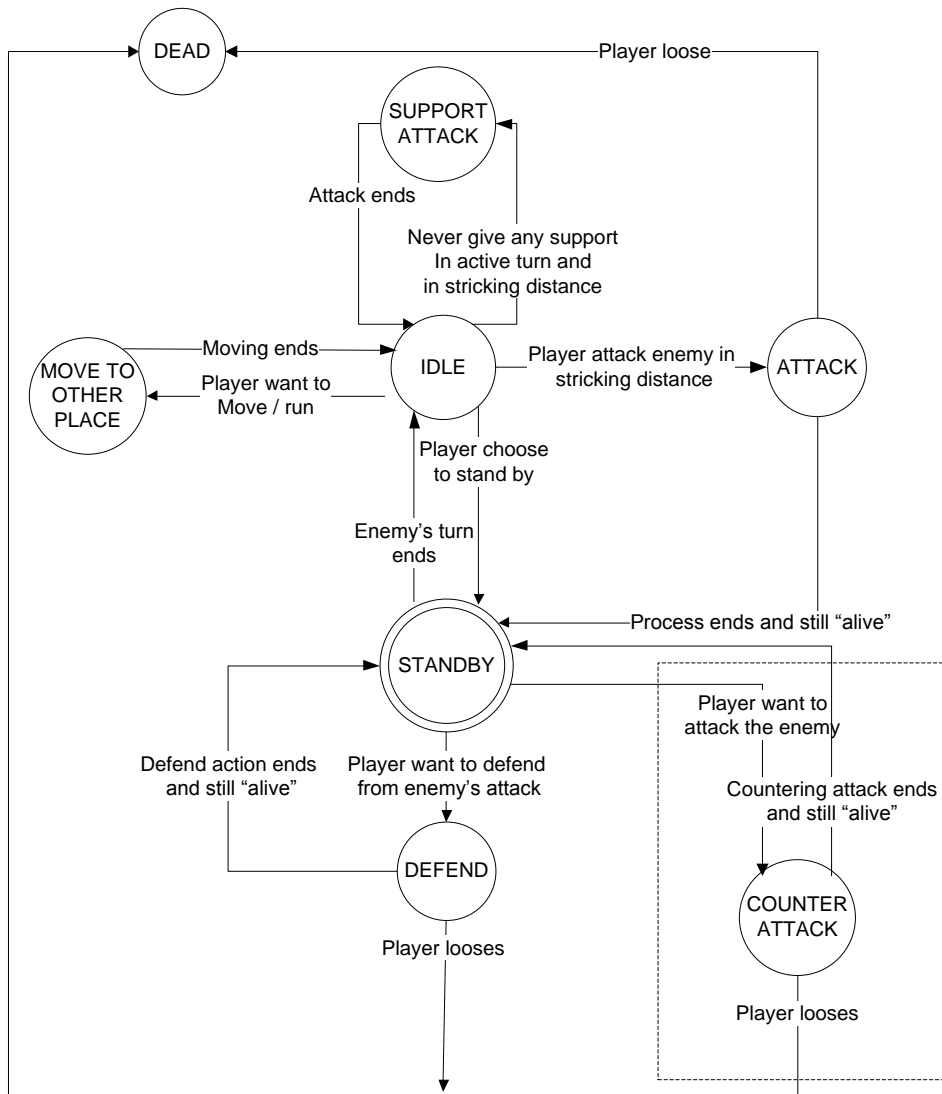
Figure-2. Finite-state machine for troop with spear and short sword, the archery don't do action in dashed box
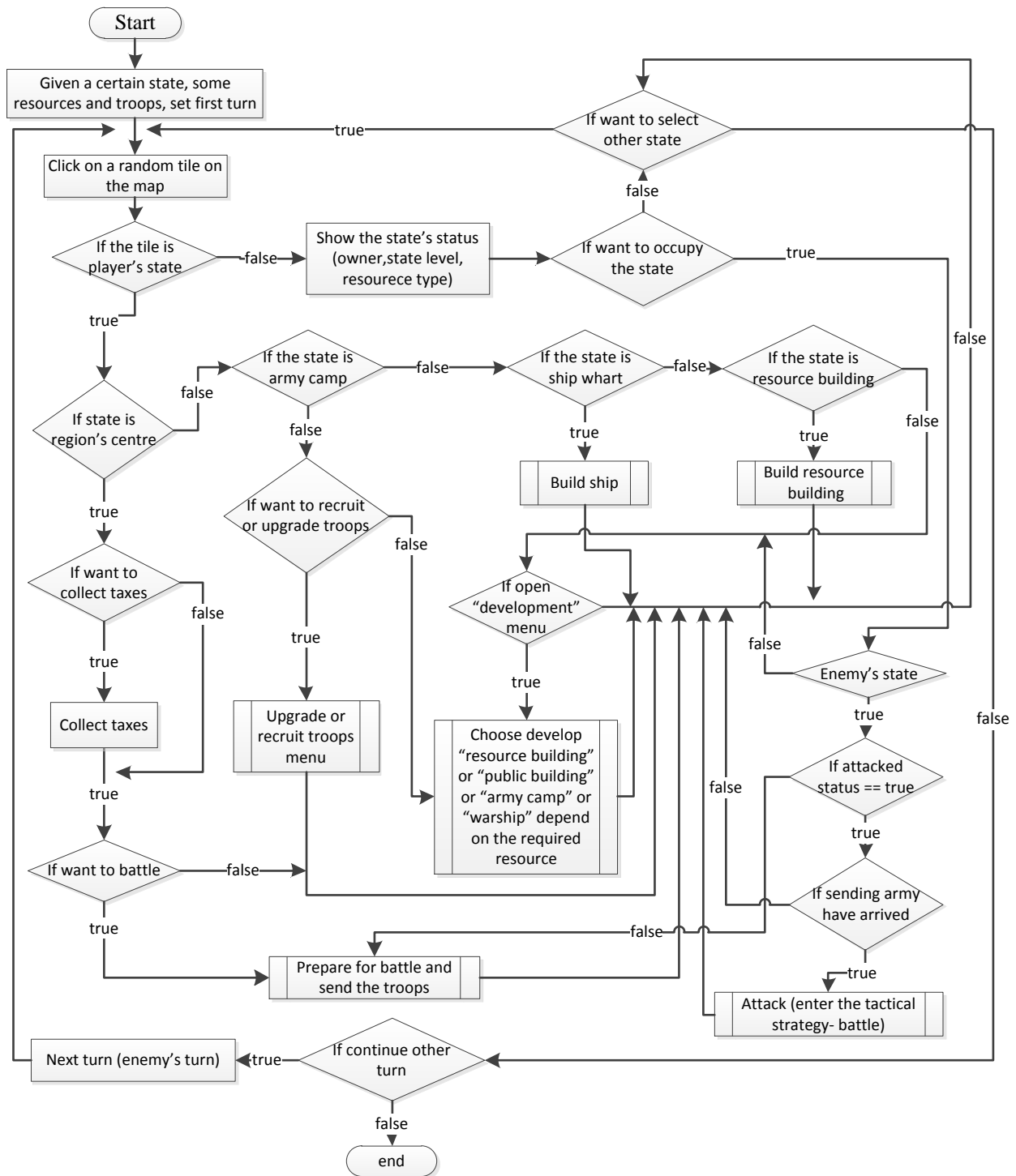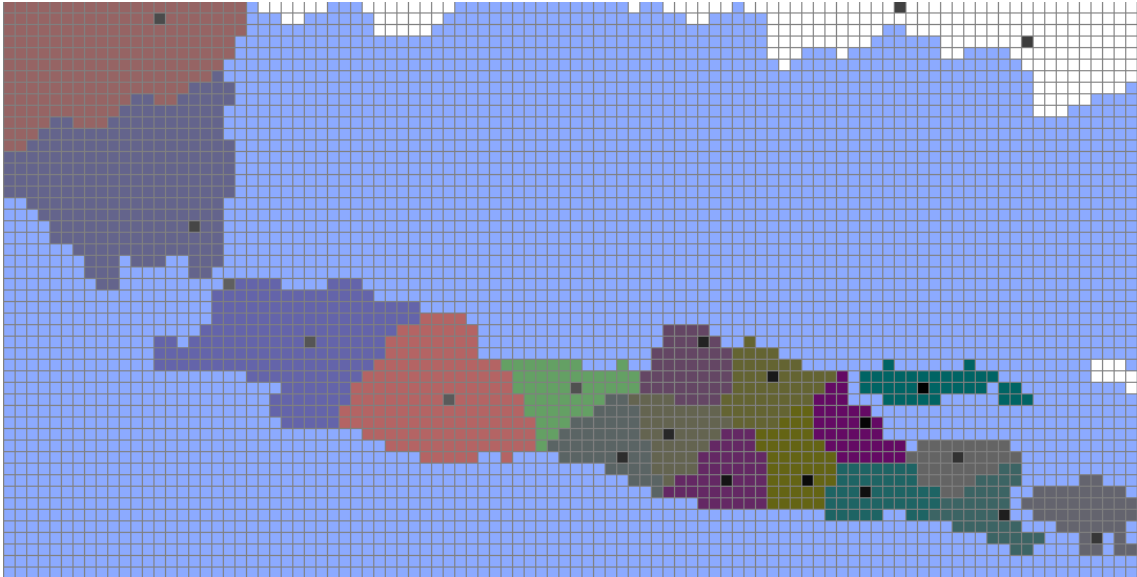
Figure-3. Flowchart of the game play

Figure-4. Flowchart of "Prepare for battle and send the troops" function
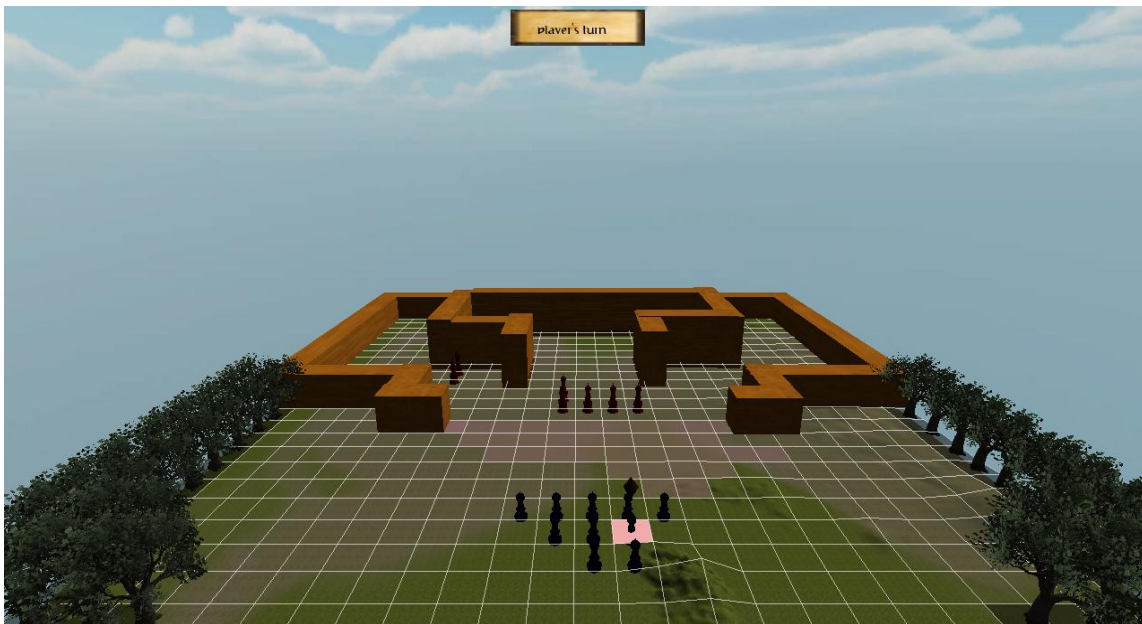

Figure-5. Flowchart of attack function (enter the battle)

Figure-6. Majapahit's main region arrangement

Figure-7. Region with its belonging in tiled display

Figure-8. Battle area