PROJECT REPORT

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PMLAB: A Serious Game for COE-DAT As a Virtual Policymaking Laboratory

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ABSTRACT

Games are considered as a form of just entertainment. However, they can have educational and practical side, at that case notion of "serious game" can be referred. There is a growing interest towards serious games in various fields. Since serious games can be utilized for wide range of opportunities. In this document, a serious game project is explained in detail. The project has been conducted to provide a policymaking laboratory for NATO COE-DAT personnel. The output of this project is aimed to use in theoretical counter-terrorism courses in order to improve strategical and effective decision-making skills of military personnel. Therefore, previous researches and example applications are investigated to conduct our project in order to provide strategic policymaking laboratory as a solution for COE-DAT.

Key words: Military Serious Game, Terrorism, Policy Making Strategy

ÖZET:

Bu proje birçok alanda kullanılan ve faydaları azımsanmayacak kadar fazla olan ciddi oyun kuramını kullanarak askeri alanda taktiğe dayalı stratejik eğitim vermeyi planlamaktadır. Günümüzde, oyunlar insana eğlenceden daha fazlasını sağlar. Bunun en önemli örneği karar verme yeteneğini artıran, gerçek hayatta deneyimlenmesi zor olan, zaman ve maliyet tasarrufu sağlayan, konsantrasyon ve dikkat yeteneğini artıran ciddi oyunlardır. Ciddi oyunlar teorik eğitimi ve uygulamalı eğitimi desteklemek amacıyla birçok alanda kullanılmaktadır. Özellikle askeri alanda kullanılan ciddi oyunlar acemi askerlerin savaş ortamlarını deneyimlemeleri için sanal bir platform sağlar. Bütün dünyada tehdit oluşturan ve yıllardır süregelen terörizm, insanların can, mal, sosyal hayat, kültürel ve ahlaki değerlerini gözetmeksizin bir yıkım politikası gütmektedir. Terörizmin zararlarını en aza indirgemek için ciddi oyunların da kullanılabileceği ön görülmüştür. Bu projenin amacı ciddi askeri oyunlar ile terörle mücadeleyi aynı çatı altında toplayarak askeri personellerin farklı terör olaylarına karşı iç ve dış ilişkilerin düzenini göz önüne alarak anlık karar verme yetisini geliştirmeye destek vermektir. Proje çıktısı maliyet- zaman tasarrufu sağlama ve zorlayıcı durumları deneyimleme imkânı sağlar. Böylece amaç; askeri yöndeki kazanımları artıran ve terörle mücadeleye katkıda bulunan bir ciddi oyun geliştirmektir.

Anahtar Kelimeler: Askeri Ciddi Oyunlar, Terörizm, Strateji Planlaması

1. INTRODUCTION

1.1. Company Background

The project has been conducted with Centre of Excellence Defence Against Terrorism (NATO COE-DAT). The intention to establish COE-DAT was announced in 01 December 2003, and it is opened in 28 June 2005 with an official ceremony by Chief of General Staff Gen. Hilmi ÖZKÖK. It consists of eight sponsoring nations that are Bulgaria, Germany, Hungary, Netherlands, Romania, Turkey, United Kingdom and United States. In 14 August 2006, NATO accredited COE-DAT as "International Military Organization". NATO COE-DAT advises on counter terrorism, supports NATO's transformation, engages community of interest and shares information, lessons learned and best practices. The counter terrorism lessons are given to military officers. The project will be completed to support these theoretical courses of NATO COE-DAT.

The project has been conducted with the military information help of Colonel Mustafa Dinç and Lieutenant Commander Halil İbrahim Tuncer.

1.2. Motivation

As a senior project group, we are interested in both game and defence field. In this project, we serve a useful and critic purpose about improving strategic skills of the military personnel about counter-terrorism. For this reason, we feel honoured to contribute into NATO COE-DAT about counter-terrorism issue. A board game has developed in order to obtain comprehensive understanding of the game and project, and we have benefited from it to eliminate the deficiency of the game. We selected Unity 3D game engine, which provides easy usage for creating games, to develop PMLAB. However, all members of the group did not have any knowledge about using Unity 3D. Some books, e-documents and online videos have been utilized to improve our Unity 3D knowledge.

1.3. Problem Statement

Although theoretical training is sufficient for a certain level, it is not enough for full improvement. Supporting strategic theoretical trainings with applied practical lessons is an important progress. This technique allows us to consolidate the theoretical lesson learned. In this context, NATO's Centre of Excellence Defence Against Terrorism (CEO-DAT) has lack of a laboratory for strategic planning and policy making. Considering the needs of

CEO-DAT, it is aimed to provide a virtual experience for the military. The benefits of experiencing possible terrorist incidents in a virtual laboratory environment are given below.

- To improve of rapid and effective decision-making capabilities by considering other characters during critical situations in the virtual environment,
- To provide interactive learning by immediate feedbacks with the decision matrix (pay-off matrix) formed by the information obtained from of CEO-DAT senior military personnel,
- To develop organization of strategic plans by military personnel according to the performance measurement obtained at the end of the game for each event.
- To increase awareness and concentration of military personnel to recognize the importance of their decisions and attitudes in the face of situations and to avoid possible bad consequences of decisions
- To save on time and cost due to created environment and tools with the simulation,
- To measure strategic decision-making performance in the terror incident scenarios, which were released collectively by military personnel and COE-DAT members,
- To increase the interest and motivation of the lesson by using game methods different from the continuous theoretical education methods,
- To be as a pioneering project for innovative work and to be an infrastructure.

1.4. Related Work

In recent years, interest in serious games based on education has been increasing. Especially, military field has interest about serious games. Serious games are usually at the practical level in projects made up to this time, and there is not much work at the tactical level in the military field. Works at the practical level cover variety of areas such as learning to use military tools and equipment, first aid training on the battlefield, combat environment experience, cultural and language training. Using of decisive factors to develop, experience and evaluate political and strategic thinking will be presented within the new tactical level. In this project, PMLAB which is planned to be developed, the results obtained by the statistical results can be adapted to the reality and can be directive for strategic plans.

As a result of detailed research, we have done, we have found the project "Sibilla" which has the closest features to our project. "Sibilla" is a serious game that is at the idea stage within NATO. It is planned to train military personnel about counter-terrorism. It aims to

prevent terror attacks with the ability to make decisions in virtual environment (Bruzzone, 2009). The illustration of the "Sibilla" game is shown in the Figure 1.

Figure 1: Sibilla Game

The Sibilla project has similar functions to our project in terms of virtual warfare environment, simulating terrorist incidents, (partially) decision making mechanism. The lack of software output of this project is also a shortcoming. In addition to this, our project is scenario-based and focused on developing a strategic plan.

1.5. Solution Statement

The solution to mentioned problem above will be explained in this section. As a solution, first of all, a prototype has been developed in order to get a comprehensive knowledge about project. For the prototype, a fictitious country Tobuta and its terror incident scenarios has been created. The eighteen terror incidents have been determined with the help of military personnel. In these scenarios, it is aimed to contain different aspects of terrorism such as political, economic, social, etc. In the prototype, board game, players

can have roles as public, media or military personnel. However, in the computer game, public roles will be played by computer as non-player characters (NPCs).

First of all, the participant encounters with a terror incident. Then s/he decides whether to share incident information, to not share incident information, or to tell a fib about incident information to non-player characters. Then, responses are selected for the incident. NPCs can give response to the participant, and the participant can respond them if s/he wants. At the end of the game, the participant's performance is evaluated. Therefore, each action, each response of both the participant, and NPCs, each terror incident's severity has a score to use them in performance calculation and game mechanism. The all scores have been determined by making a survey to high-ranking military personnel in NATO COE-DAT. Additionally, sensible and appropriate responses to both incident and NPCs has been specified with the help of military personnel. In the performance calculation, pay-off matrices will be used for each terror incident. The matrices include the scores of sharing, not sharing and telling a fib to whom. The serious game will be supported with different visuality for each terror incident scenarios. In this way, the participant will have opportunity to get better understanding of the incident.

2. LITERATURE REVIEW
2.1. Introduction

Serious games have been used for various purposes. Military field is also give attention to serious games, since they can use these games in training and education (e.g. combat experiences, strategic decision making, usage of military equipment and vehicles). In this project, COE-DAT needs a policymaking laboratory for given theoretical counter-terrorism courses to military personnel. Our aim is to develop a serious game for COE-DAT. The outcome of the project will contribute as a policymaking laboratory to improve decision making and strategical skill of military personnel.

The organization of this document is firstly followed by the notion of serious game and its examples in different areas. Then serious games are examined in the scope of military field. Previous applications and their benefits for military are investigated. In the following part, the notion of terrorism is described, and pervious counter-terrorism applications are surveyed. Finally, the paper is ended with conclusion and references.

2.2. Serious Games

Recent technological developments have a significant impact on interactive approaches such as games in terms of human-computer interaction (Hasan & Yu, 2015). Software development organizations may benefit from technological enhancements that improve decision making skills of individuals especially on social and organizational issues where the software development process relies on information-based human intensive activities (Yilmaz & O'Connor, 2011).

Serious game is a special type of game with an education and training component rather than pure entertainment. Therefore, main goal of serious games is to train or educate participants' by providing them some virtual experience (Lim & Jung, 2013). In fact, Morley et al. (2017) claim that these games are able to place a strong emphasis on awareness, understanding of problems and concessions.

It is important that the player keeps the results of what is happening in real time learning while playing the game. This dataset gives the opportunity to better measurement about the players' progressions (Freire, et al., 2016). Serious games provide the ability to collect data according to the game topic. This data goes beyond experimental tests and makes performance evaluations of users easier. It also facilitates the use of analytical methods (Peddycord-Liu, et al., 2017). Therefore, serious games are utilized for performance measurements.

According to Zyda (2005), if scientific activities using games (i.e. ludology) develops; utilization rate of serious games would increase especially in governmental and corporate areas. Some organizations take heed of innovative approach about serious games such as North Atlantic Treaty Organization (NATO), the U.S. Department of Defense (DoD), non-governmental organizations, etc. (Harz, 2006).

There are some serious games in the field of health. For example, game of "Sims" that models and simulates hospital operations was developed for nurse intern education to support their professional education (Zyda, 2005). University of Birmingham developed a serious game project known as "PULSE". Civilian and military healthcare professionals can gain experience using the virtual environment by practicing medicine with PULSE (Harz, 2006). As described by Kayabasi (2005), serious games are utilized also in education field

for teaching and learning. If serious games are utilized in schools, permanent learning rate of students should increase.

As a result, serious games can be used in different fields such as health, public policy, military, education, etc. They can improve various skills and abilities of people as well as provide them to gain virtual experience.

2.3. Military Serious Games

Another usage field of serious games are in the field of defense. Recently, military personnel have growing interest towards modeling, simulation and game development. Yildirim (2010) claims that capacity of games for increasing awareness of widespread war area and providing real time information between military units are causes of this interest. In addition, virtual operations could enhance the ability to observe ally and foe distinctions on common battlefields. They might likely to increase the performance speed of military training. Therefore, military games have been utilized in both tactical and strategical level by creating virtual operations. Some defense games are a type of serious games that contains skills trainings and first-person shooter. Strategic and tactical games require complex infrastructure in accordance with the principles they hold (Raybourn, 2014). Various institutions, especially military institution, have utilized from serious games. According to Raybourn (2014), security forces always take precautions against terrorism and its attacks. Therefore, serious military games are utilized to train security forces. Additionally, as described by Van der Hulst et al. (Hulst, Muller, Besselink, & Vink, 2013), military serious games are very beneficial and provide an opportunity, when there is an impossible or challenging situation to realize military practice for trainees. Boinodiris et al. (2016) state that for air corps, armada and army; military serious games were developed and used in virtual military trainings.

Benefits of these serious games are plenty. According to Boinodiris et al. (2016), military serious game's missions are reducing cost, saving lives and time. They mention that increasing quality of mission to 60%, while improving cycle time efficiency to 90%. Furthermore, Lim et al. (2013) note that moving all the equipment to exercise areas are time consuming and costly. However, serious games could provide all required equipment that should be included in real-time practice. Therefore, time and cost saving are other benefits of military serious games. In addition to time and cost saving, loss of life and physical injuries should be prevented by virtual exercises. Lele (2011) considers that if warfare is

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considered to do live practice for trainees, it cannot be simulated in the real life. Since, it is very dangerous for recruits. Therefore, game-based simulation gives opportunity to take risk and tricky maneuvers that cannot be taken in to risk in the real life. According to Boinodiris (2016), consequences and long-term impacts of decision of trainees can be observed and evaluated with serious wargames. Therefore, simulation is essential for military training where there is no loss of life and any damaged property (Lele, 2011).

In the limited time, planning smarter and making effective decision can be provided by serious military games. Games can be utilized for political and policy purposes. To illustrate, "America's Army" and "Airport (In)Security" were developed to stimulate critical thinking (Hulst, Muller, Besselink, & Vink, 2013). America has utilized "America's Army" in recruit's trainings to deal with rifle range and obstacles of course (Zyda, 2005). "DARWARS Ambush" is another military serious game. In this game, participants play in a convoy and get training together. They experience in moving together towards possible threats and dangers during virtual operations (Roman & Brown, 2008). As another example, "Sibilla" is serious game of NATO. It is utilized to train staffs who work in terrorism prevention. According to Bruzzone et al. (2009), the aims of game are developing analysis skills, information sharing, and giving value to information quality to prevent terrorism attacks. Thus, "Sibilla" is a good example of strategical serious game in military field.

De Freitas et al. (2007) claim that the potential of serious games to help increase the effectiveness of training and learning has been a subject of debate in much of the literature recently published in the field of learning. To bring this argument to an end, Roman et al. (2008) observed the effects of serious games on training and sought ways of learning with the help of an experiment. Therefore, they point out that Defense Advanced Research Projects Agency (DARPA) conducted an experiment on the United States Marine Corp (USMC). In the experiment, specific game-based scenarios were utilized. For the experiment, participants were separated into two groups. While control group encountered for the first time with combat scenario, another group had a desktop immersive training related with combat scenario before live training. In the live training, the control group had a success about 80% and 20% waste of time, success of game playing group was 100% in the all of runs. According to result of the experiment, it can be said that serious games are very beneficial for training and learning. Additionally, Roman et al. (2008) also mentioned a conducted research by Canadian Combat Training Centre (CTC) for Armour School. It analyzed effectiveness and efficiency of serious games in the military field. In the

experiment, participants were analyzed in different groups by dividing them into three groups. Groups used VBS (Virtual Battleship Simulation) that is a game-based simulation and multi-player educational game, and it was utilized with different usage rates for a course education. According to this research, Roman et al. (2008) proved that course passing rates and performance of the participants were increased proportionally to usage of VBS.

2.4. Terrorism

The word meaning of Terrorism has been defined in different ways. Thomas (2002) states that there is no universal acceptance for definition of "Terrorism". Therefore, a definition in the journal of COE-DAT was selected to define the term. According to Baseren (2008), terrorism means that a strategical approach contains organizedly, systematically and continuously terror for political aims to frighten, to intimidate and to threaten innocent people.

Terrorism is a global threat that must be tackled by international societies. Since, it doesn't know border, nationality or religion. The threats to international stability and welfare, and civil people of NATO occur because of terrorism (NATO, 2017). NATO aims to combat international terrorism with its allied countries (Purtas, 2005). For many years there have been many ways to deal with terrorists, such as conflict, conflict prevention, negotiation and peaceful politics. Terrorist groups are not a physical entity or legitimate representative of the population. For this reason, these groups do not conform to international law, principles and agreements (Toros, 2015). When we look at the history of terrorism, we can see many effects and actions. According to Chin (2015), the terrorist attacks were increased by 61% in 2014. Together with loss of lives, terrorist groups shake the confidence of the community in management and organization (Dogu,1992). Chin (2015) points out that terrorism has become a political war and will exist in the future as well as in the past.

Serious games have been used for different purposes in the military field. For instance, U.S. Army could cope with recruitment problem by creating the game called "America's Army". The game helped to reach volunteer soldiers to recruit. Additionally, the game of "Navy Training Exercise" has been used in recruiting by U.S. Navy. The International Center on Nonviolent Conflict (ICNC) utilized the game of "A Force More Powerful" (Susi, Johannesson, & Backlund, 2007). The game provides strategically fighting against though adversaries to improve strategic skills (Aforcemorepowerful.org, 2017). The game known

as "TacOps 4" has been used by US to train their soldiers against opposing forces (terrorism). The simulation based game contains tactical training and combat environment. The game that has been standard training device of US Army also promotes massive multiplayer teamplay. Accordingly, it demonstrates that serious games can be used to train soldiers about acting together against terrorism (Battlefront.com, 2002).

The game theory has a great impact on military field. It provides various strategic environments and policy choices pursuant to present day terrorism threats. Some researches about counter-terrorism have been conducted with the help of game theory. The application of game theory to operational decision making is supportive and encouraging for counter terrorism campaigns such as homeland security and counterterrorism officials (Jacobson & Kaplan, 2007).

Military serious games are beneficial in counter-terrorism trainings and education. They can be used in different areas in military domain. BinSubaih et al. (2009) state that wide range of military training opportunities are provided by serious games. These opportunities are tactical experience, rifle range, ambush, foreign language and culture, leadership, post-traumatic stress order and obstacle courses. Therefore, a variety of games has been developed for military education and training field. As we mentioned in "Military Serious Game" part, the impact of the serious games used for training in military fields is significant.

In conclusion, serious games are utilized in various fields. Developments in military field are very significant. It provides many advantages such as critical decision making, time and cost saving, virtual experience, etc. Therefore, recruits and trainees can be trained effectively. Our project's goal is to develop a serious game for COE-DAT to address their virtual policymaking requirements. COE-DAT can use the outcomes of this project as a complementary tool to help training their personnel against terrorism.

3. SUMMARY

3.1. Summary of Conceptual Solution

PMLAB is a military serious game project that aims to train military personnel about policy making and strategic decision making by eliminating the lack of a virtual policymaking laboratory for trainees taking the theoretical strategic anti-terrorism course. PMLAB's goal is to create a platform that supports practically theoretical lessons in order to increase the success rate of military personnel.

In this platform, some scoring and payoff matrices will be used in the calculations for evaluate the performance of the user. A survey is being conducted to calculate the values of the pay-off matrices and scores required to increase the closeness of these calculations to reality and to make accurate measurements. According to this questionnaire, the mathematical mechanism will be completed.

3.2. Technology Used

Unity3D is a game engine used to visually process scenes, simulate them, and handling events in this simulation. Unity3D will be used in the PMLAB project to simulate various scenarios and other visual content. In this game engine, 2D environments will be created, these environments will be programmed, and the designs of the models will be made. Unity3D is a game engine that is popular among professional and amateur game developers (Norton ,2013). Unity 3D supports various programming languages like C #, Boo and JavaScript. In addition, Unity Pro is a cross-platform game engine that includes packages like Android and IOS and allows you to work on any operating system (Windows, Mac OS X, Linux, Android and IOS). Another factor that makes Unity3D popular among professional and amateur game developers is that it has a user-friendly development environment and a simple interface (Huang & Gui, 2015). Blender that open source, 3D Studio Max and asset store can be used modelling objects. Although the Unity3D game engine supports three programming languages, C # which a modern object-oriented programming language, will be used to create the scripting parts of the project. The reasons why we use C# as our programming language are that the people in the project group know and, they are prone to C #.

4. SOFTWARE REQUIREMENTS SPECIFICATION
4.1. Introduction
4.1.1. Purpose

The aim of software requirements specification (SRS) document is describing military serious game. A serious game will be created for COE-DAT as a virtual policymaking laboratory. This serious game' aim is to train military personnel about policymaking and strategic decision making. This document contains detailed information about requirements of the project, proposed software functionalities and identified constraints.

4.1.2. Scope of the Project

COE-DAT is a NATO accredited multinational sponsored entity. The mission of the COE-DAT is supporting NATO and nations by providing key decision-makers with realistic solutions (Coedat.nato.int, 2017). Mobile education and advanced training courses have been given to NATO and partner countries' personnel by COE-DAT. The courses contribute to strategic training and skills of the personnel (Coedat.nato.int, 2017). However, only theoretical courses are not sufficient to handle with real life conflicts. Generally, theoretical courses are supported with practical courses to improve success rate. Therefore, military personnel who takes these types of courses needs a practicing platform. However, COE-DAT could not provide practicing platform for strategic decision-making counter terrorism courses. Additionally, there are not enough platform that provides virtual policymaking to deal with this problem all around the world. The project for COE-DAT aims to solve this lack of virtual policymaking laboratory problem.

A serious game is created to meet the need of policymaking laboratory in NATO COE-DAT. Military personnel will have an opportunity to practice that they learn at the theoretical course. The project is supported with realistic event scenarios in accordance with experience of Turkish Armed Forces personnel. The scenarios are based on realistic events or situations which include terrorism actions. The game includes agents that can make decisions depending upon different situations. The strategic success of military personnel will be evaluated with the help of scenarios by giving responses, taking actions and responses of military personnel in the serious game.

The serious game includes actors of participant and admin. A participant can interact with other non-player characters (NPCs) to share information that she/he holds, and NPCs can give response towards actions of participant. The admin is able to add an event to the game event list, and can change action and response points in the payoff matrices (see Glossary). In addition, admin can make alteration in the virtual simulation game with the help of granted password to admins.

4.1.3. Glossary

Terms	Definitions
Trainee	The military personnel that plays the game.
Stakeholders	Any person who is a contributor of this project.
Military Serious Game	The game that is utilized by Military institutions with the aims of education, training, etc. (Michael & Chen, 2011)
Virtual Environment	"It is synthetic sensory information that leads to perceptions of environments and their contents as if they were not synthetic." (Blascovich, et al., 2002)
Simulation	It is a close representation of reality in the virtual environment (Thiagarajan & Stolovitch, 1978).
Payoff Matrix	A matrix that contains points for some situations such as decision making in order to measure performance of participants.
NPC (Non-player Character)	The characters (that have counter-terrorism roles and allies' roles of the participant) are played by computer (Merrick and Maher, 2006).

Table 1: Glossary Table of SRS

4.1.4. Overview of the Document

The functionalities of the project: a serious game for COE-DAT as a virtual policymaking laboratory will be described in the second part of the document. Informal requirements will be expressed before technical requirements, since informal requirements are a context between them in Requirement Specification part.

Functionality and technicality of the virtual military serious game are detailed in the Requirements Specification chapter for software developers.

4.2. Overall Description
4.2.1. Product Perspective

A serious game for COE-DAT as a virtual policymaking laboratory is a military serious game project that aims to give strategic practice opportunity for trainees that take theoretical strategic counter-terrorism course. At the end of the project, the serious game will be used by military institutions to support their courses.

4.2.2. Development Methodology

The most common types of agile software development methodology that is Scrum has been determined to use in development methodology. Scrum development methodology provides easy planning, fast feedback, frequent checkpoints and improved return on investment (Yilmaz, 2017). Scrum is used to manage complicated software projects. It gives descriptions about how tasks in the project is to be done in details instead of providing complete on project. Scrum development methodology divides project time into the periods, and divides works into sub-works. In the project development process, the sub-works are completed within a certain period. All of these periods are called "sprints". At the end of each sprint, software product should be available and workable (Cohn, 2017).

The scrum team should decide the number of sprints to divide the project process. The scrum teams are small. The ideal size of the team should be 7 +/- 2 people (Scrum-institute.org, 2017).

Sprint 1	Sprint 2	Sprint 3	Sprint 4

1. Design Scenario Characters
2. Design Environment Model
3. Design Military Characters
4. Create Textures
   4.1. Environmental Textures
   4.2. Object Textures
5. Animation
   5.1. Event Animation
   5.2. Character Animation
6. Testing
	1. Create Response
	   1.1. Responses of NPCs
	   1.2. Responses of Trainees
	2. Integrate Decision Making Tree (DMT)
	3. Create Scenarios
	4. Create Scripting
	   4.1. Environment Coding
	   4.2. Character Coding
	   4.3. Animation Coding
	   4.4. Implementation Coding
	5. Audio Design
	6. Testing
		1. Design GUI
		   1.1. Login Panel
		   1.2. Progress Bar
		   1.3. Messagebox & Dialogbox
		   1.4. Scenario Settings Panel
		   1.5. Response Settings Panel
		   1.6. Score Displaying Panel
		2. Edit Audio
		3. Integrate Video
		4. Integrate Points to Payoff Matrices
		5. Create Scripting
		6. Testing
			1. Design Database
			2. Edit Decision Making Tree
			3. Testing & Integration
			   3.1. Alfa Testing
			   3.2. Usability Testing
			   3.3. Functional Testing
			4. Maintenance
			5. Release

Figure 2: Sprint of the Project

Sprints are significant part of scrum methodology in the scope of the quality objectives. Each sprint provides a definition about what will be produced, it includes a design guide and a flexible plan. (Schwaber & Sutherland, 2017). Due to mentioned features above, scrum methodology is an appropriate method for this project. In our project, the total project development time was divided into four sprints as shown in Figure 2. At the end of each sprint, the output is tested, and required arrangements and maintenances are done.
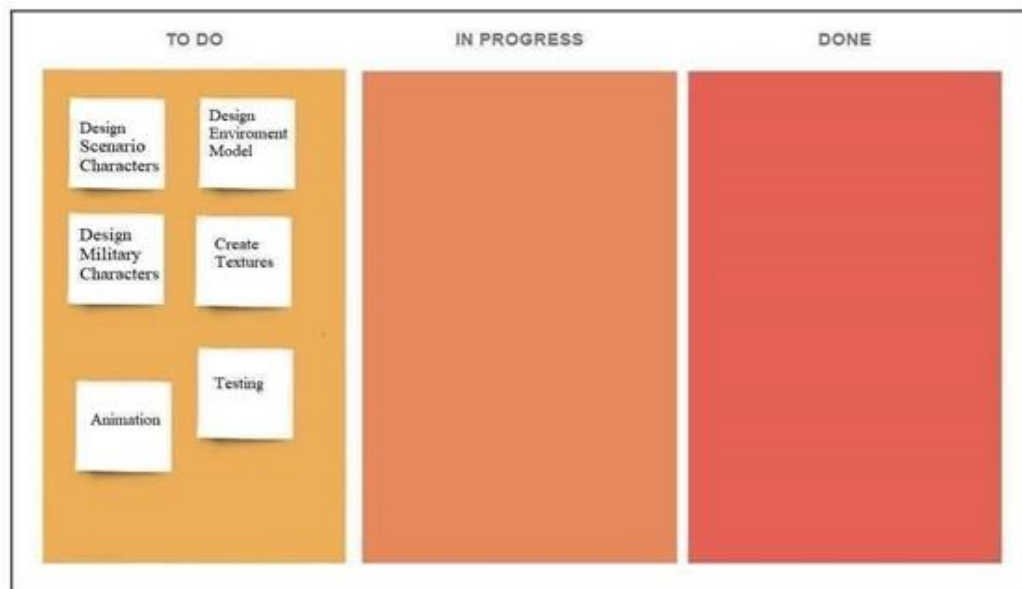

Figure 3: Scrum Board with Tasks

A scrum board (in Figure 3) have been also used to complete tasks in the current sprints. Tasks are written on different cards. Scrum boards is divided into three stages. These stages are "To Do", "In Progress", "Done" respectively. "To Do" stage includes the task cards which will be planned to complete according to priority of the tasks. "In Progress" stage represent the task which are currently continued. In the "Done" stage, successfully completed tasks are indicated. "To Do" stage contains tasks which are determined in the first scrum meeting. These specified tasks are listed below.

• Design Scenario Characters

• Design Environment Model

• Design Military Characters

• Create Textures

• Animation

• Testing

The Gantt Chart represented in Appendix A shows the time schedule of the project. It consists of two parts. The first part consists of research and documentation. Documentations contains literature review, preparation of SRS and SDD documents. In addition, the preparation and publication of the project's website is among the works to be done in this section. All the jobs in the first section cover approximately 80 days, and waterfall methodology has been used. The second part deals with the development of the project. It consists of 4 sprints. Each sprint covers a 30-day period. In the Sprints, Scrum development was done taking into consideration the job scheduling, and at the end of each sprint a period of time was used for the test.

4.2.3. User Characteristics
4.2.3.1. *Trainee*

- Trainee must be NATO COE-DAT military personnel.
- Trainee must know English that is common language for COE-DAT personnel in order to understand terror scenarios within this application.

- Trainee must participate theoretical course against terrorism that is given by competent institutions.

4.2.3.2. *Admin*

- Admin must be NATO COE-DAT military personnel.
- Admin must know English that is common language for COE-DAT personnel in order to understand terror scenarios within this application.
- Admin must be specialist of theoretical course against terrorism.

4.3. Requirements Specification
4.3.1. External Interface Requirements
4.3.1.1. *User Interfaces*

The user interface will be worked on cross platform.

4.3.1.2. *Hardware Interfaces*

There are no external requirements for hardware interface.

4.3.1.3. *Software Interfaces*

There are no external requirements for software interface.

4.3.1.4. *Communications interfaces*

There are no external requirements for communication interfaces.

4.3.2. Functional Requirements
4.3.2.1. *Profile Management Use Case*

Use Case

- Login
- Register
- Display Old Scores
- Start Game
- Get Event

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- Check Stamps

- Take Response

- Give Response

- Display Event Score

- Sharing Decision of Event Information

- Share

- Tell a fib/Make Up

- Do not Share

- Choose NPCs

- Logout

Diagram:
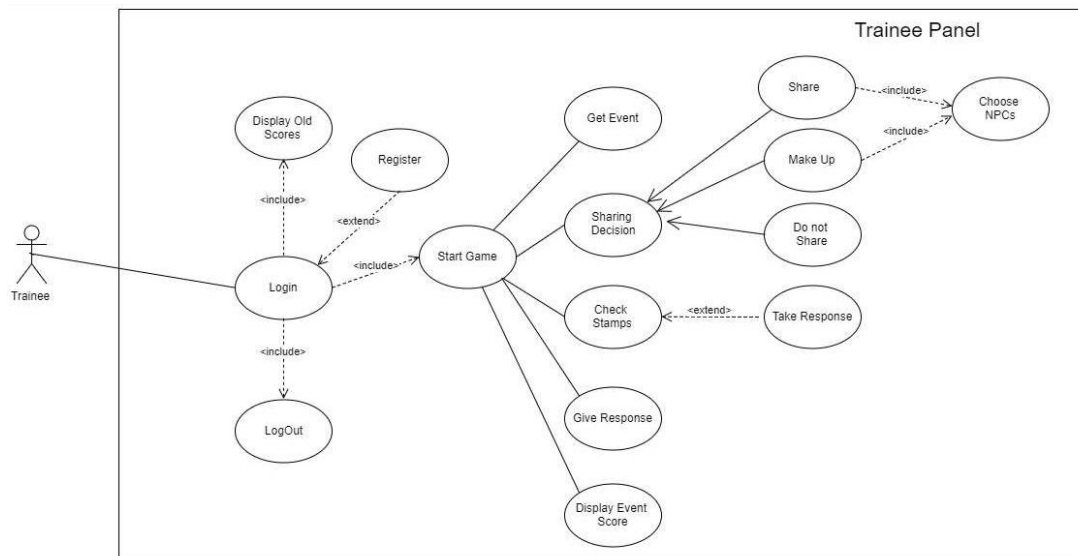

Figure 4: Trainee Panel Use Case

Brief Description:

The use case of trainee panel is shown in Figure 4. Trainee can use the "Login", "Register", "Display Old Scores", "Start Game", "Get Event", "Check Stamps", "Take Response", "Give Response", "Display event Score", "Sharing Decision of Event Information", "Do not Share", "Choose NPCs", and "Logout" functions in the trainee panel.

Trainee must make decisions about the terror event that comes to him/her. The trainee can decide whether to share the terror event or not with NPCs. In addition, trainee can tell a fib/make up information about the terror event to share. Trainee can respond to terrorism or NPCs, display event score and see all old scores.

Initial Step by Step Description:

1. Trainee can access to system by logging in with id information and password.

    1.1. If the entered password does not match with their information, trainee must try to login again.

    1.2. If trainee does not have a membership in the system, trainee must register to be able to login to the system.

2. Trainee can start the game.

    2.1. Game simulation starts when game panel is opened, and game simulation is repeated for each scenario.

    2.2. Trainee can decide to not share information about the scenarios. Trainee can share information correctly or can make up information/tell a fib about the scenarios to share. Trainee must choose at least one of the NPC's to share. S/he has the right to not share information with anyone.

    2.3. Trainee can give responses to NPCs. S/he should check whether there is enough stamp, before giving response.

    2.4. Trainee can take responses from NPCs.

    2.5. Trainee can display event score at the end of each event cycle.

3. Trainee can display all the game scores played until that day.

4. Trainee can logout from the system.

    ### 4.3.2.2.   Admin Panel Use Case

Use Case:

- Display All Old Scores

- Scenario Settings

- Add Scenario

- Update Scenario

- Delete Scenario

- Response Setting

- Add Response

- Calculate Pay-Off Matrices

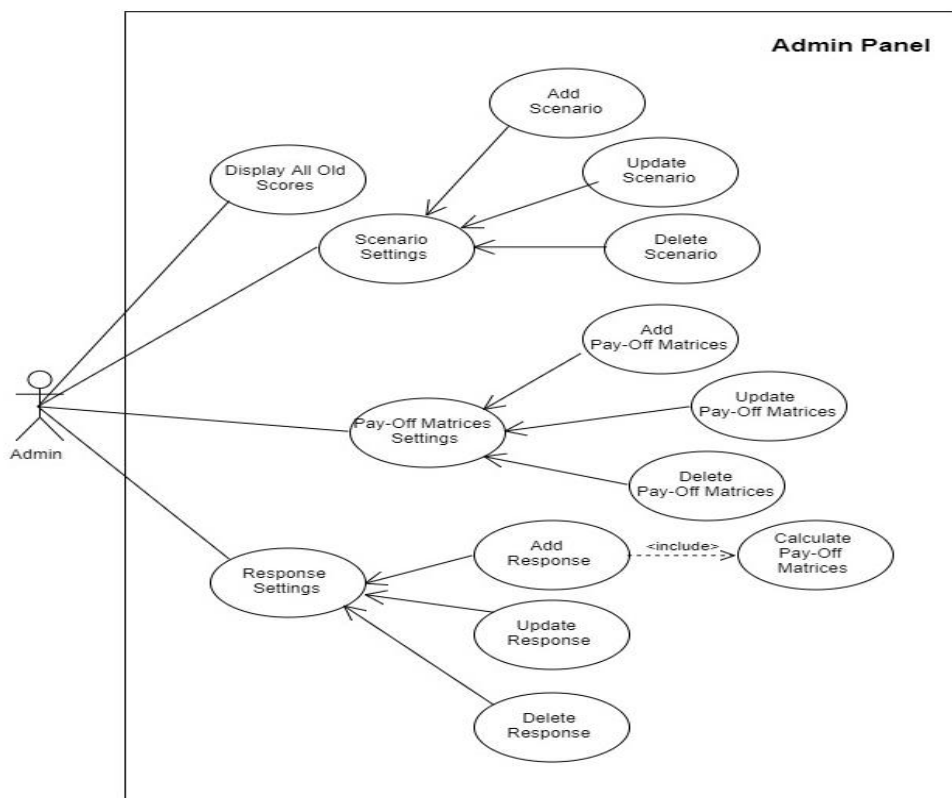- Update Response

- Delete Response

Diagram:

Figure 5: Admin Panel Use Case

Brief Description:

Figure 5 represents the use case of admin panel. In the application, admin have some rights about game regulation. These rights include adding, deleting terror scenarios and updating some features of an existing scenario. Admin have rights to update payoff matrices

points, and terror event points. Furthermore, admin can make some arrangements and additions for responses that are given by NPCs or trainee. That is, admin can add-delete responses corresponding to each terror event. Additionally, updating responses can be done by admin.

Initial Step by Step Description:

1. Admin can manage scenarios, which are in terror event list.

    1.1. When admin selects the 'Add Scenario' option, the related panel appears to enter information of a new scenario.

    1.2. When admin selects the 'Delete Scenario' option, the related panel appears to select an existing scenario to delete.

    1.3. When admin selects the 'Update Scenario' option, the related panel appears to update information of the selected scenario.

2. Admin can manage response options of the related events.

    2.1. When admin selects the 'Add Response' option, the related panel appears to display event lists. Admin can add a new response after an event is selected from event list.

    2.2. When admin selects the 'Delete Response' option, response deletion panel appears. Admin can delete the response of a selected event after an event is selected from the event list.

    2.3. When admin selects the 'Update Response' option, response update panel appears. Admin can update information of a selected event response after an event is selected from the event list.
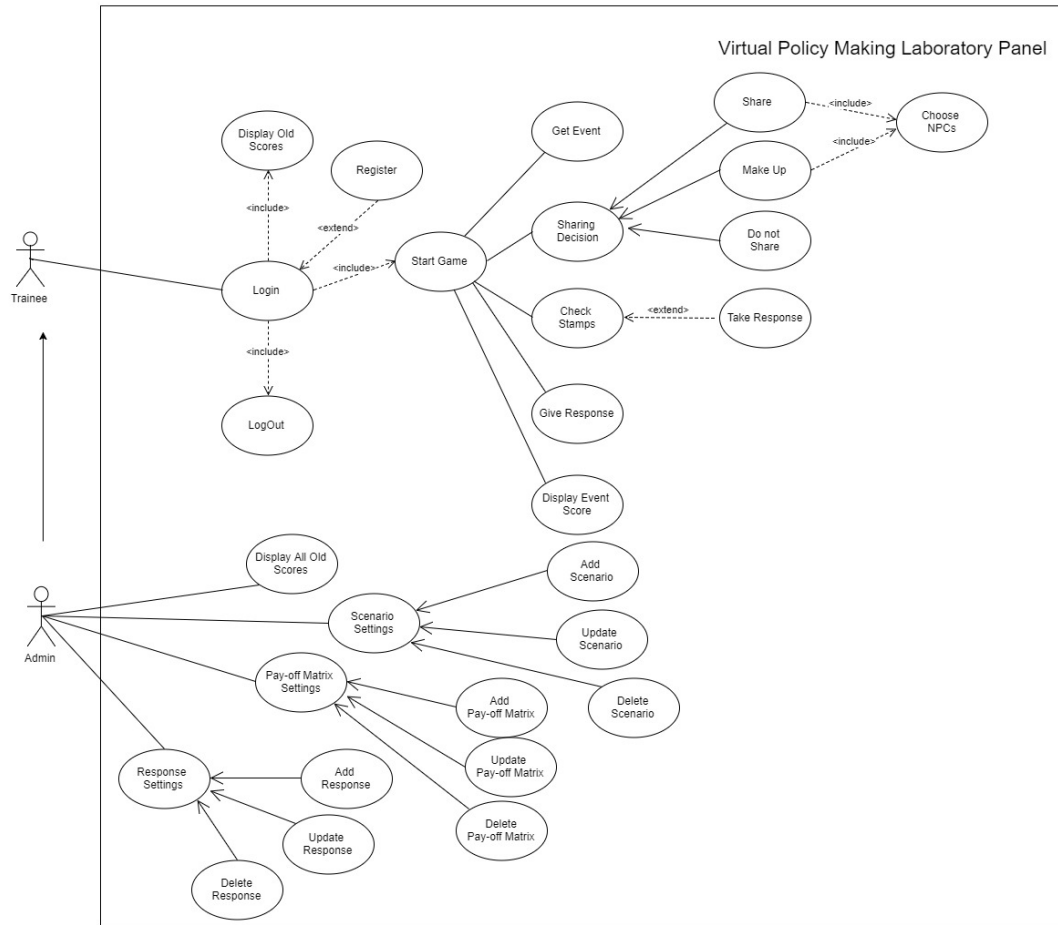
Figure 6: Virtual Policy Making Laboratory Panel Use Case

The use case in the Figure 6 is the combination of Figure 4 and Figure 5. Figure 4 shows that admin can do everything that trainee can do.

4.3.3. Performance Requirements

The application will be created by using Unity 3D. Therefore, version of Unity 3D 2017.1 or upper versions of Unity 3D 2017. 1 must be supported. Operating system must be Windows 8.1 or its upper versions.

4.3.4. Software System Attributes

4.3.4.1. Portability

- The fact that the plant does not need equipment other than the basic hardware elements makes the portability of the plant easier.
- The program which will be developed with Unity 3D supports cross-platform. Thus, it provides advantages for portability to different platforms.

4.3.4.2. Performance

- Trainee cannot see scoring values that are effective in the decision mechanism of each terrorist event.
- Animations about responses should not be played unless the trainee is unresponsive.
- The trainee cannot see the consequences of that decision before they decide.

4.3.4.3. Usability

- The output of the project should be passed from usability tests. The application will be appropriate for users who have intermediate computer knowledge.
- The application doesn't require complex hardware components. Thus, installation and configuration of the application is simple for any system.

4.3.4.4. Maintainability

Developing technology leads to new adaptations, additions and innovations for the system. Therefore, object oriented programming will be used in order to make alterations and maintaining easier.

4.3.4.5. Scalability

Designed to measure the performance of multiple personnel, the system is now handled as a single player at the same time. There is a demand of multi-player requirement. Therefore, multi-player feature is determined as future plan to develop the system in terms of scalability.

4.3.4.6. Security Requirement

There is a requirement to prevent the possible external threats, access and usage of the application in the scope of security issue. Therefore, hashing of user's password will be used to protect the application from external threats.

5. SOFTWARE DESIGN DESCRIPTION
5.1. Introduction
5.1.1. Purpose

The purpose of the Software Design Development Document is to elaborate the architecture and system design of the serious game project entitled as PMLAB: A Serious Game for COE-DAT as a Virtual Policymaking Laboratory.

The target users of the project are high-ranking military personnel of NATO COE-DAT. The PMLAB, is planned to utilize in theoretical courses about counter-terrorism given by NATO COE-DAT to train military personnel. This study aims to provide a virtual policymaking laboratory in order to improve strategic and decision-making skill of the military personnel. According to a fictitious country created, the project is supported with possible and realistic terror incidents scenarios which are approved by NATO COE-DAT military personnel.

5.1.2. Scope

The project has been conducted with the help of NATO COE-DAT (Centre of Excellence Defense Against Terrorism) by using their military knowledge. It will provide a serious game to support theoretical counter-terrorism courses of NATO COE-DAT. Therefore, PMLAB will be useful for military personnel.

The trainee, military personnel, has opportunity to see various aspects of terrorism, and according to terrorism aspects, trainee has to decide on some actions. In this way, the PMLAB provide the benefits of developed decision-making and strategic skill to trainees.

In the serious game, the trainee encounters with a terror incident. Terror incidents taken place randomly are supported with virtual simulations to recognize and live through the incident. After facing with the terror incident, the trainee has to decide on whether to share, to not share or to give incomplete information about the terror incident.

The trainee shall interact with non-player characters (see glossary) that are media and public about the decision. Furthermore, a response to the terror incident shall be given by the trainee. Taking response from NPCs and responding them is also possible in the game. According to the decisions and responses of both trainee and NPCs, the score of the trainee is calculated for the terror incident. At the end of the game, the trainee can display his/her own performance.

Norton (2013) states that as a game engine, Unity 3D has become popular among both professional and amateur developers. One of the factor that makes Unity popular is that it has a user-friendly development environment and simple interface (Huang & Gui, 2015). In addition, it also supports various programming languages such as C#, Boo and JavaScript; furthermore, it is a cross platform game engine which allows working on any operating system (Okita, 2014). Due to these features, game developers can create a video game more easily and quickly by using Unity 3D (Creighton, 2010). As a result, Unity 3D is appropriate for the PMLAB project. Hence, the designing and programming of the project will be performed on Unity 3D as a 2D game.

As a project group, we have chosen the C# programming language, since all members of the group are able to use C# programming language, and Unity3D supports this programming language. Blender, 3D Studio Max can be used in modelling objects, and free model assets in unity asset store also can be utilized.

5.1.3. Glossary

Terms	Definitions
Trainee	The military personnel that plays the game.
Non-player Character (NPC)	The characters (that have counter-terrorism roles and allies' roles of the participant) are played by computer (Merrick and Maher, 2006).
Cross Platform	A system related with computer that can work across different operating systems or platforms (Techopedia.com, 2017).
Gantt Chart	The graphical demonstration of a project schedule with end dates, finish dates, elements of the project (Investopedia, 2017).

UML diagram	A diagram represents the structure of an object-oriented software design (Selonen, et al. 2003).
Block diagram	A diagram that illustrates the relation between components of the system with shapes and lines (BusinessDictionary.com, 2017).
Terrorism	Terrorism means that a strategical approach contains organizedly, systematically and continuously terror for political aims to frighten, to intimidate and to threaten innocent people (Baseren , 2008).

Table 2: Glossary Table of SDD

5.1.4. Overview of the Document

The document continues with the following sections with explained contents.

o Section 2: *"Architecture Design"* that contains actors, exceptions, basic sequences, priorities, pre-conditions and post conditions is detailed. In addition to architectural design, class diagram of the system is also explained.

o Section 3: *"Use Case Realization"* that includes a block diagram of the system takes part in section 3. The diagram is created with respect to the use cases explained in the System Requirement Specification document.

o Section 4: *"Environment"* part which indicates sample environment visualization of the project prototype is in the section 4. Also, the scenario for prototype is expressed.

o Section 5: *"References"* are indicated in the section 5.

o Section 6: *"Appendix"* is attached to section 6.

5.2. Architecture Design
  5.2.1. Simulation Design Approach
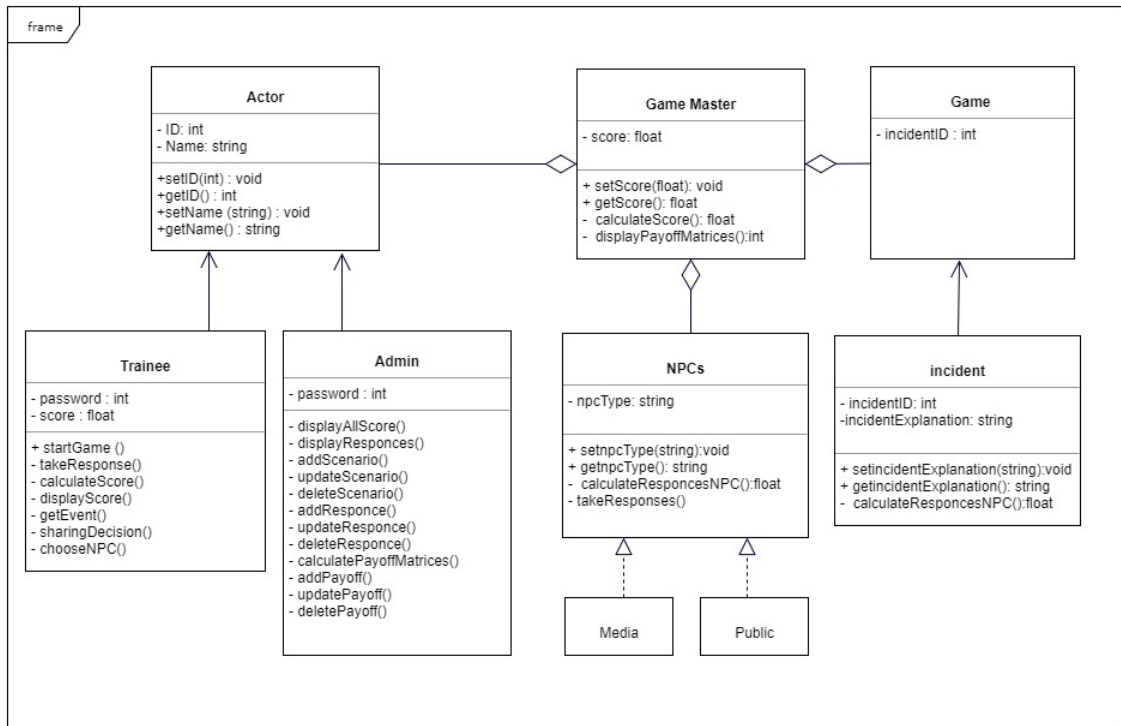   *5.2.1.1.   Class Diagram*

Figure 7: Class Diagram of PMLAB Project

UML diagrams are a standard method for modelling and planning the system's software. Figure 7 shows the class diagram for PMLAB. The "Game Master" class is the main class that involves all systems. It has a direct connection to all other subsystems. "Game Master" class includes "Actor", "NPCs", and "Game" classes. The main class provides the connection between subclasses. The "Actor" class represents users who use the system. "Trainee" and "Admin" classes inherit from the "Actor" class. "Admin" class represents actors who can modify and edit the system. "Trainee" class represents the actors who will play and be trained. "NPC" class is a class that can decide, play and behave like a player in the game. The characters and functions of the different members of the "NPC" class are determined by the programmer. The media and the public are defined as NPCs. Game class is about the content of the game. "Incident" class, which is a subclass of the "Game" class, holds information and functions of terror incident.

5.3. Architecture Design of Simulation

5.3.1. Profile Management

Summary: The game system can be used by admin and trainee who are both military personnel. The trainee can register and login to the system, display all own scores. In addition to these, Admin can interfere with user accounts.

Actor: Trainee, admin

Precondition: Both must be military personnel.

Basic Sequence:

1. Trainee registers with ID on the military identification card.
2. Trainee login to the system with ID and password after registration.
3. Trainee can display all his/her scores on the system.
4. Admin can confirm the registration of new interns.
5. Admin and trainee can logout the system.

Exception: Database connection can be failed.

Post Conditions: The necessary setup for the game.

Priority: Low

5.3.1.1. Admin Page

Summary: This system will only be used by admin. Admin will be able to make changes about the game in this panel. They will be able to view the scores of all participants. Admin will be able to add, delete, and update scenarios for the game. For all characters (NPCs and trainee), it will be able to add, delete and update the response by admin.

Actor: Admin

Precondition: The number of admins controlling the system is sufficient

Basic Sequence:

1. Admin can configure scenario settings such as add, delete and update scenarios.
2. Admin also configure response settings such as add, delete and update responses.
3. Admin must calculate the payoff matrix for every change that makes in the game.
4. Admin can display all players' scores and sort them among them.

Exception: Incorrect information input by admin.

Post Conditions: Changes made by the administrator must be successfully installed on the system.

Priority: High

5.3.1.2.   Game Page

Summary: This system contains the whole system in which the game is played. For strategic planning, all reactions and events are organized. Trainee and admin can use the system by logging in with the necessary information.

Actor: Trainee, admin

Precondition: The participant can login to the system.

Basic Sequence:

1. The trainee chooses a region on the map where the terrorist incident take place.
2. The trainee follows the simulation of the terrorist incident that occurs in the selected region.
3. The trainee has the right to response to the general or selected character of the terror incident.
4. There is a requirement that there are enough stamps to give a response. It can control the number of stamps.

5. The trainee can give the information about the terror incident NPCs.

6. The player can response to the characters.

Exception: Database connection can be failed.

Post Conditions: Record scores taken in the game. Giving feedback about your strategic planning in the game.

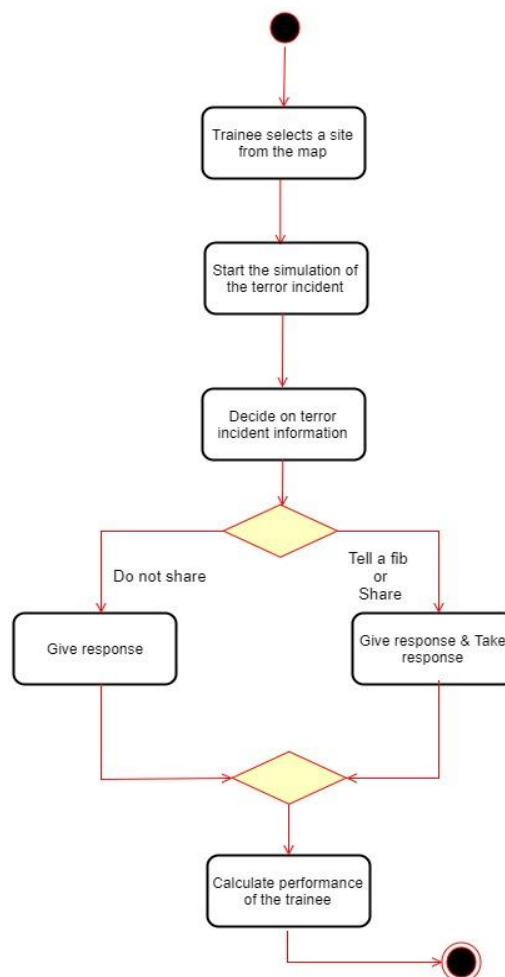**Priority:** High

5.4. Activity Diagram

Figure 8: Activity Diagram of Scenario Generator

The activity diagram in the Figure 8 indicates working system of the scenario generator. First, trainee shall choose a site from the list. Then, the trainee has to decide about terror incident whether to share, to not share or to tell a fib. If the trainee does not share the information of the incident, s/he can only give response. Otherwise, the trainee

can give and take responses. At the end, some methods and algorithms are used to calculate performance of the trainee to end the game of scenario.
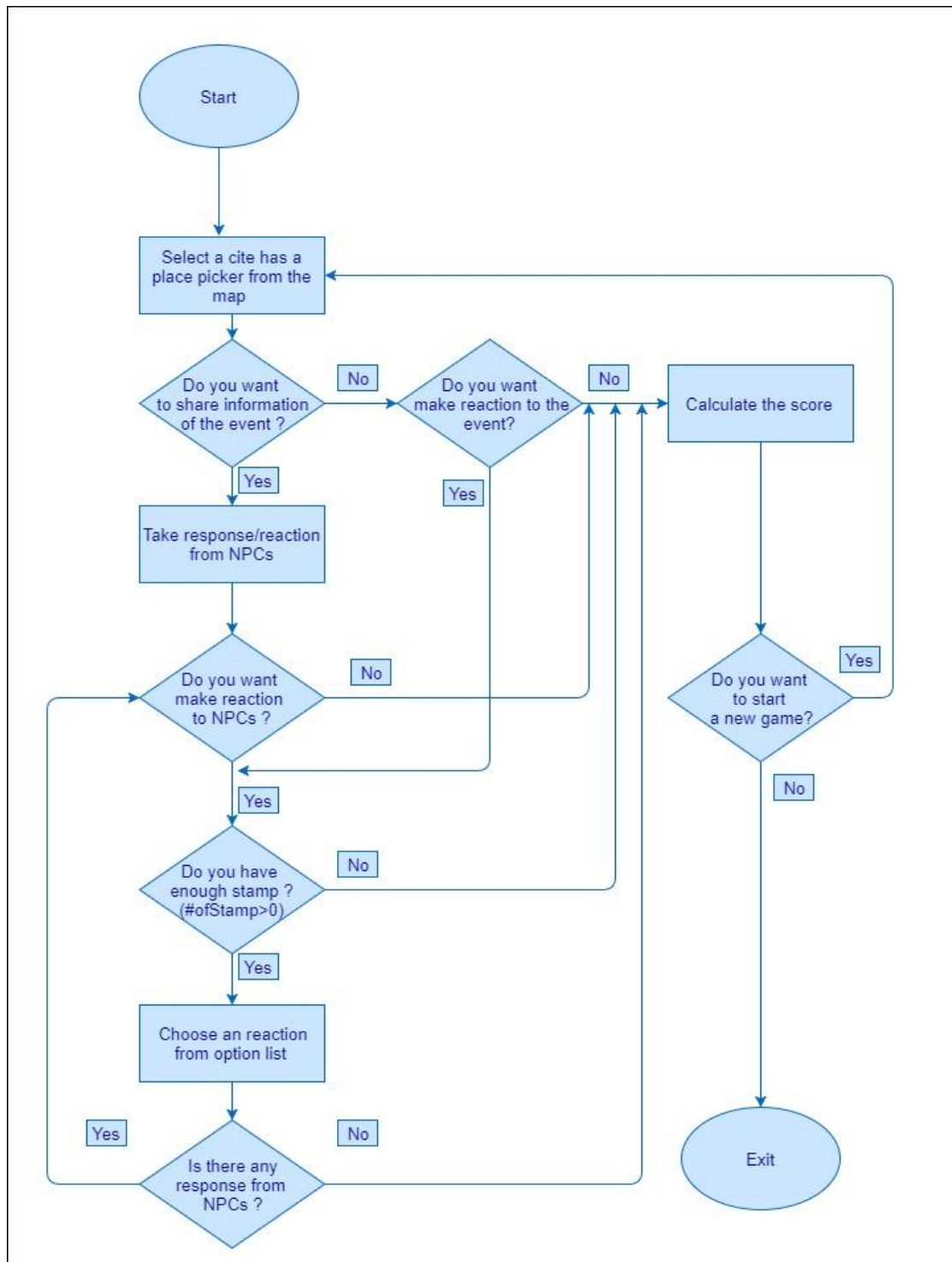
5.5. Flowchart

Figure 9: Flowchart of the PMLAB Project

In the Figure 9, flow of the game is illustrated with flowchart according to view of the trainee. The "Start" operation, which indicates the beginning of the game, also initiates the flowchart. The trainee must select a region on the map that opens in the game scene. Subsequently, the trainee answers certain questions that are important to the operation of the system. These are "Do you want to share information of the event?", "Do you want to make reaction to NPCs?" and "Do you have enough stamp?", "Is there any response from NPCs?", "Do you want make reaction to the event?" and "Do you want to start a new game?". Some of the steps made according to the answers given to the questions lead to the advancement of the system. Some of them are "Select a cite has a place picker from the map", "Take response/reaction from NPCs" and "Choose a reaction from options". The command that end the system is the "Exit" command.

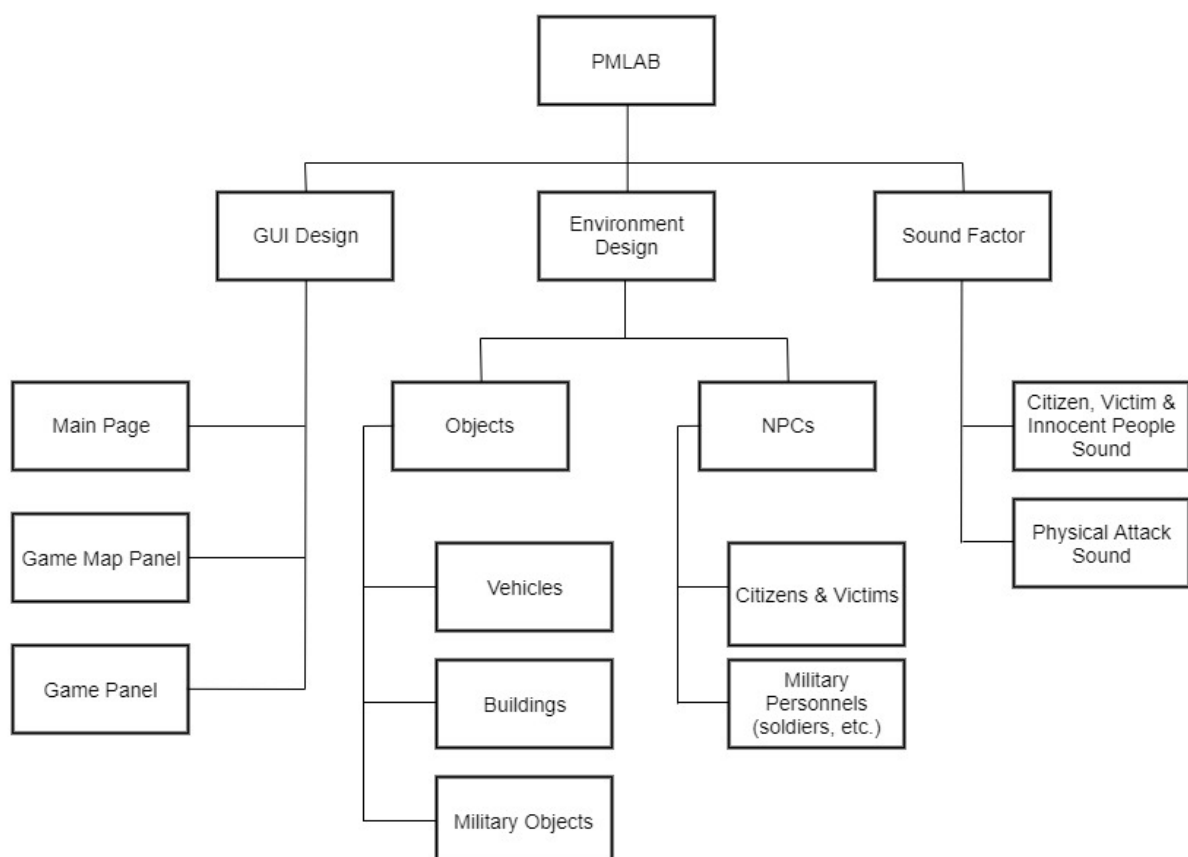## 5.6. Use Case Realizations

Figure 10: Components of PMLAB

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5.6.1. Components of PMLAB

In the Figure 10, designed components of the PMLAB is demonstrated with a block diagram. The system consists of three main components, and each component has own sub-system.

5.6.1.1. *GUI Design*

GUI design provides interaction between the trainees and the system. It comprises main page, game map panel, and game panel. First of all, the trainee encounters with main page which is the start page of the system. In addition, trainee is also able to register, login, logout from the system and display his/her own all old scores.
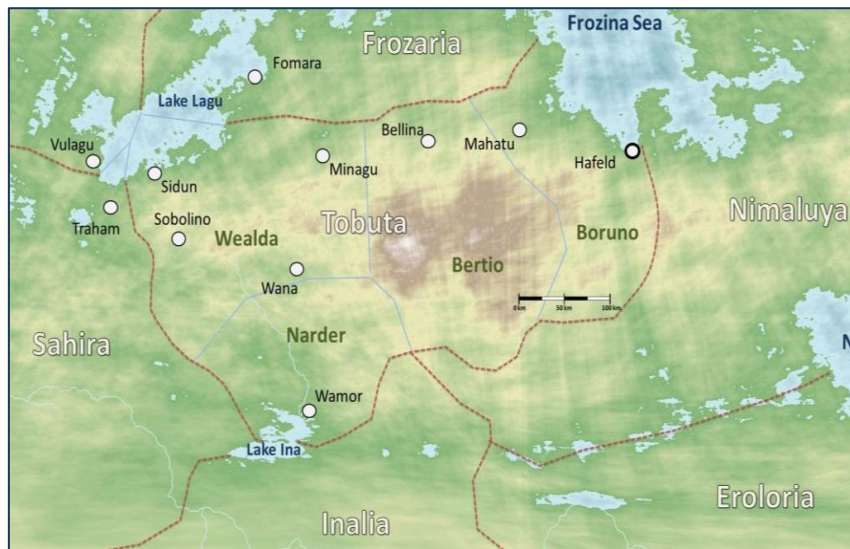
Figure 11: Map of Tobuta country

The designed fictitious cities of Tobuta country are indicated in the Figure 11. These cities are Sidun, Minagu, Bellina, Mahatu, Hafeld, Bruno, Bertio, Narder, Wana, Wealda and Sobolino. Different terror incident scenarios (see Appendix B) has been written for the cities. Hence, the game map panel provides selecting a site from the map to play. The game panel is accessed after selecting a site from the map. The panel includes a random scenario that is belong to that site, the trainee plays the game on this panel.

5.6.1.2. *Environment Design*

The system will use different environments for each terror incident scenario. The scenarios can be experienced indoors or outdoors according to contents of the incident scenarios. In other words, airport environment, harbour environment, office environment, etc. will be created for different scenarios. The environments can contain non-player characters and objects such as citizens, soldiers, aircrafts etc.

5.6.1.3. *Sound Design*

Sound design provides to improve closeness to the reality of the game simulation. According to scenarios, related sounds will be integrated into the system such as physical attack sounds, victim and innocent people sound, vehicle (bus, aircraft) sound, etc.

5.7. ENVIRONMENT
5.7.1. Modelling Environment

This project will be developed by using serious gaming techniques and Unity's 2D tools. Some tools are utilized to model the objects to be used in the game such as Blender, 3D Studio Max. However, there are many free models in the unity asset store. It is also possible to make models using these assets.

In the project, it is planned to design different environments for each terrorist incident scenario. For the 18 different terrorist incidents, there are different environments in the environmental plan such as green areas, roads, office environment, airport environment, harbour environment, etc.

Figure 12: Place Pickers for Terror Incidents

The map shown in the Figure 12 consists of virtual countries and cities. The place pickers on the map indicate that there is a terrorist incident in that area. By clicking on these place pickers, the simulation of the mentioned terror event begins.
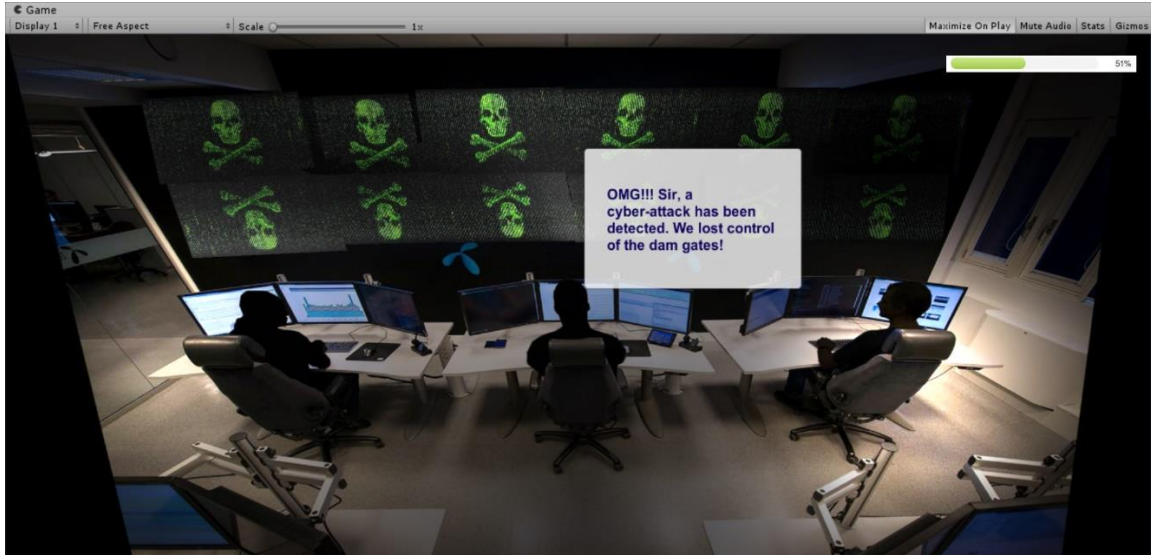
Figure 13: Game Scene of a Cyber-Attack

In the Figure 13, the event about cyber-attack is simulated. As a result of the attack, the control of the dam gates is lost, and the related information is supported with a dialog box. After a short intro on the screen with the main outline of the event, a text about the details of the incident is displayed in the text form.

Figure 14: Decision Panel of the Game Scene

The check boxes, buttons and a text box will be used for decision-making and response functions. At the same time, the progress bar in the top panel, representing the

stamp source, controls the sufficiency of resources for the trainee's reactions. It must be in every game scene. There are buttons for sharing, do not sharing and giving incomplete information (telling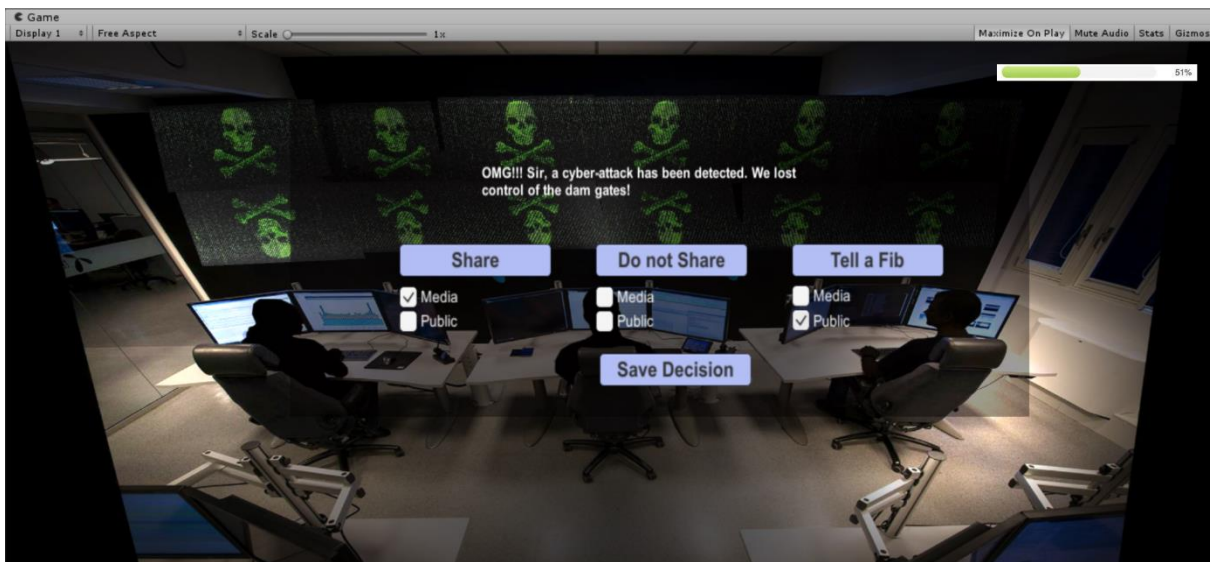 a fib) options for deciding about information of the event (in Figure 14). Depending on the button clicked by the trainee, he must select non-player characters. Trainee uses the check boxes to select NPCs. Then, the decision has to be saved by clicking "Save Decision" button. The next panel will provide taking responses from NPCs and giving response to the terror incident and NPCs. The responses are listed with the terror incident explanation text after deciding about sharing the incident information, not sharing the incident information and telling a fib about information of the incident. The trainee has to select one or more responses from the list according to his/her stamp resources. That is, number of responses to select is limited by stamp resources.

6. CONCLUSION

The project titled as "PMLAB: A Serious Game for COE-DAT As a Virtual Policymaking Laboratory" is explained in detail. At the end of the project, a policymaking laboratory as a serious game will be provided for NATO COE-DAT military personnel. Our aim is to improve strategic thinking, planning ang effective decision-making skills of the military personnel.

First of all, we have made an extensive literature research. According to literature research, we have recognized that there is not any project that is actualized. Some projects exist; however, these projects are generally about military equipment training, combat training, etc. PMLAB is a new project in the related field of the serious games, since other projects are not strategical. After the literature review, requirements of the projects have specified with the help of COE-DAT military personnel. According to requirements, software requirements specification (SRS) has prepared. Then, software design document (SDD) has prepared, and the design of the project has explained in the SDD. While we have conducted the project, a development methodology has selected, and we have created a board game as a prototype of the PMLAB project. A fictitious country and its eighteen terror incidents have designed for the project with cooperation of military personnel and our senior project group. In this way, we have benefited from the prototype for PMLAB computer game.

According to the research done, there are not many works in this field that provides improvement of strategical thinking, decision-making and planning. One of the advantage of PMLAB, military personnel, who plays the PMLAB, will have an opportunity to experience different terror incident with various aspects of the terrorism. In this way, military personnel can increase own performance in strategic and effective decision-making skills. The project will be developed with Unity3D as a 2D game. Therefore, the project will provide effective visual for the users, and users can be able to have a comprehensive understanding of the terror incidents in the game. At the end of the game, users, trainees can see their performances and their faults. Therefore, the output of this project will be beneficial and impressive for the military personnel of COE-DAT.

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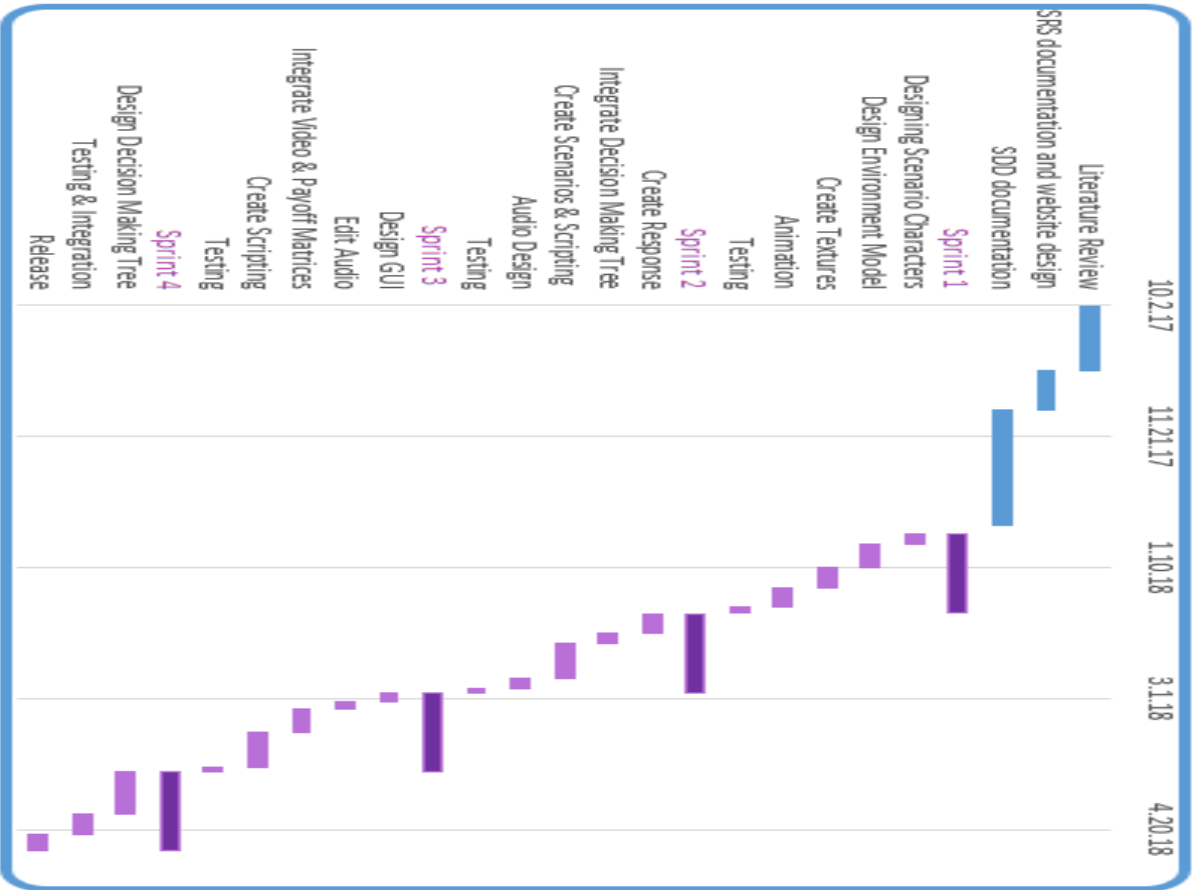
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9. APPENDICES

Appendix A:

Task Name	Start Date	End Date	Duration
Literature Review	2.10.2017	27.10.2017	25
SRS documentation and website design	27.10.2017	11.11.2017	15
SDD documentation	11.11.2017	25.12.2017	44
Sprint 1	28.12.2017	27.01.2018	30
Designing Scenario Characters	28.12.2017	1.01.2018	4
Design Environment Model	1.01.2018	10.01.2018	9
Create Textures	10.01.2018	18.01.2018	8
Animation	18.01.2018	25.01.2018	7
Testing	25.01.2018	27.01.2018	2
Sprint 2	28.01.2018	27.02.2018	30
Create Response	28.01.2018	4.02.2018	7
Integrate Decision Making Tree	4.02.2018	8.02.2018	4
Create Scenarios & Scripting	8.02.2018	21.02.2018	13
Audio Design	21.02.2018	25.02.2018	4
Testing	25.02.2018	27.02.2018	2
Sprint 3	27.02.2018	29.03.2018	30
Design GUI	27.02.2018	2.03.2018	3
Edit Audio	2.03.2018	5.03.2018	3
Integrate Video & Payoff Matrices	5.03.2018	14.03.2018	9
Create Scripting	14.03.2018	27.03.2018	13
Testing	27.03.2018	29.03.2018	2
Sprint 4	29.03.2018	28.04.2018	30
Design Decision Making Tree	29.03.2018	14.04.2018	16
Testing & Integration	14.04.2018	22.04.2018	8
Release	22.04.2018	28.04.2018	6

Appendix B:

	TERROR INCIDENTS	MILITARY PERSONNEL RESPONSE LIST
1	Five terrorists were defused last week while terrorist protests were being suppressed in the south of Boruno city. However, terrorists decided to open a case about this event in the Court of Human Rights.	1. To start legal procedures. 2. To impose a broadcast ban on against negative impacts. 3. To impose a broadcast ban.
2	According to comprehensive researches, power cut issues are seen frequently during the day in the eastern villages of the city of Minagu. Terrorists broke down the electrical system, and they are using illegal electricity.	1. To send a team to the region. 2. To use violence in order to suppress protest of public. 3. To impose a broadcast ban.
3	The harbour in the northeast was physically attacked by terrorists, and the entry and exit for ships were blocked. Import and export of the country have stopped. The economic crisis is unavoidable!	1. To make secure the region. 2. To send a team to the region. 3. To impose a broadcast ban. 4. To stop harbour for trades.
4	The transponder of the airport was cut by terrorists. The passengers are nervous! Flights from abroad are planned to continue without transfers. Economic troubles will occur.	1. To take precautions against possible dangers by sending a team. 2. To make researches about transponder breakdown. 3. Ignoring the event without doing any research.
5	Terrorists, that stopped the intercity bus (from Sidun city to Minagu city), took the passengers hostage.	1.To make movements by guaranteeing life security of the hostages and providing security of the region. 2.To make movements by not considering life security of the hostages.

6	Commander of the land forces were kidnapped by terrorists.	1.To make movements by guaranteeing life security of the hostage.
		2.To make a statement to the press
		3.To make movements by not considering life security of the hostage.
7	Petrol resources were seized. The resources in the east of the city of Hafeld are under threat. Terrorists are beginning to grab of some of them.	1. To send teams to the related region.
		2. Attacking to cleanse the region from terrorist organizations.
		3. Being active in the region without considering life security of the civilians.
8	Attack on diplomatic relations! A military aircraft was detected in the air space between our country and the border country. Political relations with the neighboring country have become tense. Military vehicle is thought to be ours. Is there a complot?	1. To take precautions against possible hazards by sending teams to the region.
		2. To investigate identification of the military aircraft.
		3. Ignoring the incident that is considered as unimportant.
9	A big commotion in college! At Lamar University, a group of terrorist university students invited against other students. The students who were brainwashed caused a big event at the university.	1. To send a team to the region.
		2. Investigating to find the terrorist person/group who started the incident
		3. To place the people involved in the incident under arrest.
		4. To ignore the event that should not be exaggerated.
		5. To use disproportionate force on involved people.
10	Degrading news! A soldier was kidnapped by terrorists and the torture video of the soldier is circulating in the media!	1. To impose a broadcast ban.
		2.To investigate the source of the sharing, and doing the required actions.

11	Support for the terrorists from neighboring countries! The neighboring country "Frozaria" provides financial support and weapons to the terrorist organization!	1. To tighten controls in the boundaries of the country.
		2. Indicating negative and cold attitude towards the relationship with the neighboring country.
		3. To hide the incident from human beings.
		4. To continue the relationship with the neighboring country same as before.
12	Forcible participation in terrorist organizations! In Narder, public are forced to join terrorist organizations.	1. To make plans to prevent and stop terrorists.
		2. To contribute into actions to raise awareness of the public about the issue.
		3. To ignore the difficult situations of the local public by believing that they can handle with it.
13	The terrorists leaking in to Tobuta Federal Police were identified.	1. To identify the leaked persons by conducting a thorough investigation of the incident.
		2. To take suspicious people into custody as soon as the incident is detected.
		3. To take action without detecting the leaked persons.
14	By establishing a political party, the terrorist organization has begun to interfere in the state affairs through legal means.	1. To make plans to prevent potential hazards by carefully examining the actions of the members of the political party.
		2. To not do anything by considering that the legal action is democratic.
15	The Central Bank of the State has detected a cyber-attack. Customer's bank accounts are under threat.	1. Detecting the source of the cyber-attack by researching the incident.
		2. To take safer precautions for future.
		3. To pass off the matter by considering that it is bank's own problem.

16	A live bomb exploded in the center of the Hafeld city.	1. Providing regional security.
		2. To send a military team to the region.
		3. To send a crime scene investigation team.
		4. Make a statement to the press.
		5. To give misinformation/incomplete information about the situation to the public.
17	Terrorists are, also, attacking the education field. Schools in Bertio are forced to close.	1. Providing regional security and arresting members of the terrorist organization.
		2. Taking required precautions.
		3. To forward students to different schools by considering that the problem is solved.
18	Bruno city was reported to have been used for smuggling tobacco and drugs by terrorists.	1. To send a team to the related region.
		2. To tighten controls at border
		3. To not interfere with the members of the organization captured from smuggling, and to let them to be released.