PUBLIC AWARENESS THROUGH GAME-BASED LEARNING

Project Id: 2020-054

Project Proposal Report

K.A.R.T Keenawinna

B.Sc. (Hons) Degree in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology

Sri Lanka

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(Proposal documentation submitted in partial fulfilment
of the requirement for the Degree of Bachelor of Science Special (honors)
In Information Technology)

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Declaration

I declare that this is my own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Student ID Number	Name	Signature
IT17162142	K.A.R.T Keenawinna	Ruwin

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the supervisor: Date

....24/02/2020

Dr.Windhya Rankothge

Abstract

Today safety is the very import one in the safety awareness programs. Today mostly accidents are increasing day by day rapidly. Small children to become victims of road accidents. Because they don't have a good understanding from their childhood on how to use the road and road rules. Although there are books on road safety, some people do not have an interest to read them. Specially, small children do not pay much attention to read their books. Although there are so many road safety systems developed people don't have a good system to get a clear idea about road safety. Therefore, under this road safety need to make a system under the traffic rules and regulations and prevention of accidents preventions. First, it is important to find out the reasons for these accidents. Then it must be identified how these reasons affect the accidents. Finally, by identifying the ability it helps to design a most suitable game.

Keywords: game-based learning, Virtual reality, Awareness game

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1 Introduction

1.1 Background

While there are about 21,381,002 population in Sri Lanka most of the people among die due to road accidents. Road accidents are on the rise and have reached a peak in recent times with fatal accidents recorded almost daily causing multiple deaths. Road deaths have reached tragic proportions with one person killed every 3 hours and the number of seriously wounded double or Trible. The total number of people who died on our roads last year due to road accidents was 3,164, 1,211 people were riders and pillion riders of motorcycles. While 930 were pedestrians and 423 were passes years [1]. According to the latest WITO data published in 2017, the road traffic accidents deaths in Sri Lanka has 3,554 or 2.8% of total deaths [2].

Some people have written books a bait road safety to make the people aware about them.

The translations of the book, Reporting on Road Safety: a guide for journalists-in Sinhala and Tamil has been made possible through the cooperation of the SLMA and the Institute for Violence and Injury Prevention (IVIP) and the patronage of the Disability, Injury Prevention and Rehabilitation Unit of the South East Asian Regional Office (SEARO) of the World Health Organization (WHO) [3].

Advance traffic management and mobile traffic health centers for education / enforcement purposes on highways.

The picture below shows the rate of road accidents which happened during the last years.
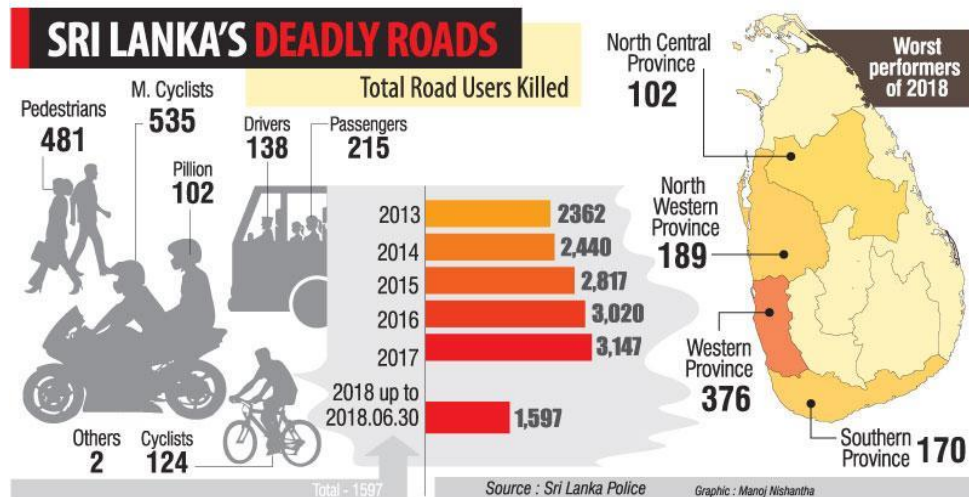

Figure 1. 1: Rate of Roach Accidents

The picture 1.1 Depicts the rate of road accidents which occurred in 2018 and the western province has the highest road accidents. It is 376. Among them, most of the deaths have occurred due to motorcycle accidents. It is 637. According to the statics concerning last 2,3 years 2016 has highest road accidents.

1.2 Literature survey

1.2.1 Common problems Faced in Existing System

- **Road Safety Awareness among College Students in a North Indian Town**

  This game has mainly been used for the college students in a North Indian town. Using this system, the students are given a knowledge about road safety and traffic regulation [4].

- **Computer Games as Learning Children Road Safety Education**

  This is computer base game. This game has been covered mainly about road accidents. How they happened? / Who are victims? / Why their accidents happened the places? / Where accidents happened mostly?
  This system has mainly been focused for children. As it is a computer base game, they use 2D technology [5].

- **Tackling children's road safety**

  This is a mobile base application but not a game. The students are given an idea using video clips and animation about road safety.2d technology is used here. There is a method of tackling children's road safety [6].

- **Using VR with smart phones for road safety awareness and timing**

  This system using VR technology, the people are given an awareness about road safety. It is covered, how they cross the road? / Traffic accidents? / How accidents occur? / How do they prevent them. Through this system it can be used to measure the knowledge about road safety of people [7].

1.2.2 Features in the Proposed System

- VR Technology is used for the game.
- People learn through this game. (Game Base Learning)
- The user can check whether he/she has developed the knowledge about road safety.
- This is a user-friendly game and it can suitable for anyone.
- Android base game is developed.

1.4 Research gap

There are many road safety systems are developed by the people. But most of them are focus on small children. Most of the systems are developed by using different methods. But most of these systems are developed by looking at only the general problems. But we try to develop a most suitable virtual reality game of road safety system and a user-friendly road safety system by identifying the ability.

Table 1 1: Comparison between our system and other existing applications which are in use

	Features	**Road Safety Awareness among College Students in a North Indian Town**	**Computer Games as Learning Children Road Safety Education**	**Tackling children's road safety**	**Using VR with smart phones for road safety awareness and timing**	**Proposed game [AwareME]**
Safety Awareness [Road Safety]	**Rules of road (crossing the road, traffic accidents)**	✔	✔	✘	✔	✔
	Audience (Children)	✔	✔	✔	✘	✔
	VR (Virtual Reality)	✘	✘	✘	✔	✔
	2D/3D Technology	✘	✔	✔	✘	✔
	Using ability	✘	✘	✔	✘	✔

1.4 Research problem

Annually, 6.717 death rate for people die due to various reasons of last year. Among them most of the people die due to road accidents. The people do not obey the rules and regulations and they do not have awareness of there are the reasons for these deaths.

There are many factors for the road accidents.

- Crossing the road carelessly
- Running Red Lights
- Reckless Driving
- Drunk Driving
- Speeding
- Wrong-Way Driving/ Improper Turns
- Construction Sites
- Driving Under the Influence of Drugs

According to them it is clearer that the people don't have an obvious method to learn about the road safety. And they even don't care about the methods available now. So, at present there are no favorable method which goes among people as soon as possible.

2 Objectives

2.1 Main objective

Here we try to develop a road safety awareness game for awaring the people on road safety. Most of the accidents happen today due to the carelessness of the most of drivers and pedestrians. Here it helps to get a good and correct decision at the time (for an example whether a pedestrian will cross the road or not and when to cross the road?). This helps to improve the knowledge on the road rules and safety rules and by that improved knowledge, it helps for the people where to use that knowledge in the road and the way he used that knowledge to prevent from accidents. By that they can go safely on the road.

2.2 Specific objectives

- Design the gaming platform using virtual reality.
- It helps to give a good knowledge on road rules for children.
- It helps to reduce the day today accidents.
- Identify the user's progress by measuring their level of awareness through an acceptable process.
- It helps to get a good knowledge about road rules.
- It helps to develop the ability.
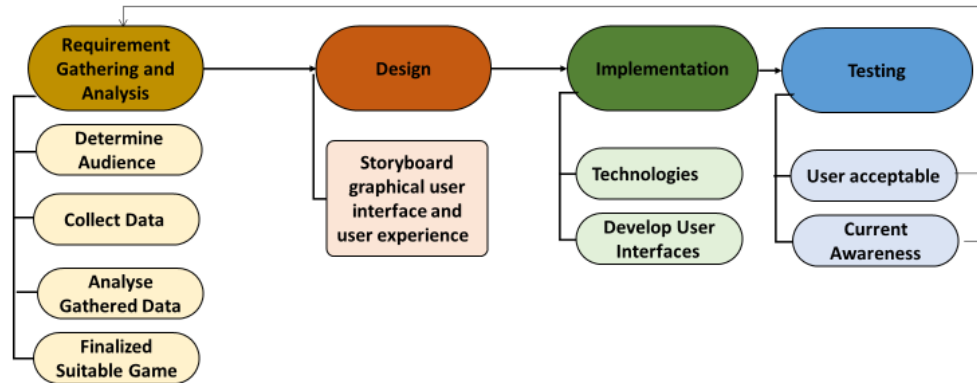
3 Methodology

3.1 Flow of the project

Above 3.1 picture depicts the process of the system. The Waterfall architecture is used there. There are four steps and they are requirement gathering and analysis, Design, Implementation and Testing. The sub steps must cover all the main steps.

3.1.1 Requirement gathering and analysis

By this step the requirements needed to create this game is found out. More emphasis is given to find out how to gather information to make this game. To check the peoples' knowledge a questioner is given. Few people (30-35) are selected randomly (without age limit). After getting the results the game can be developed.

3.1.2 Design

In this phase of the development, the designing of the system will be prepared. System design helps to gather the system requirements and come up with the overall architectural design. The Design phase is very important for a strong foundation of the system & to provide the proposed features to the user.

3.1.3 Implementation

In the implementation phase, requirement specifications and design specification will be implemented. According to the implementation plan, the overall project will be done using waterfall model. But implementation of the main components such as prediction models, optimization modules and travel guide model will be implemented as agile projects.

Without combining each component together, they will be implemented separately using agile techniques. The components mentioned above implemented using different tools and technologies. After completing optimizing module and prediction module they will be combined with the travel guide module. In fact, the prediction module implemented as a service module for optimizing module and optimizing modules implemented as service modules of the travel guide module.

Implementation will be then carried out with optimized travel guide application for the mobile users. And unit testing and component testing will be made during implementation of each component. Tools such as unity, android studio, adobe photo shop, blender, adobe illustrator and SQLite are used.

3.1.4 Testing

This step is very important. Here at first the user is given a questioner. After using this game, the user is given a questioner again. Here the user's knowledge is checked and it is easy to checked whether the user's knowledge is improved.

3.1.5 User Acceptance Testing

Now, the game has developed and a user can be given 3 chances to use. The marks scored at the first chance by the user is compared with the final score. Finally, we can understand whether they have gained Some knowledge about road safety by this game.

If they can't get a good result, there must be a reason for that. So, till the expected result come true it must be updated.

Unit Testing – Unit testing is conducted for each and every component. Unit testing is carried out under a white–box test methodology. Unit testing lets developers determine that the program's individual units' function as per requirement and are error-free, thereby freeing up system error overall.

Component Testing – Component testing is performed on each individual component separately without integrating with other components.

Integration Testing – Integration testing works to expose interface defects and integrated component interaction. Progressively larger groups of tested software components which correspond to architectural design elements are integrated and tested until the software works as a system.

System Testing – System testing, or end-to-end testing, tests a fully integrated system to ensure it fulfills its needs. Waterfall model can only be achieved in testing by splitting the coded system into separate manageable units. After that, those units are incorporated into the complete system in the integration process.

Test Cases

These test cases are used to test the game after its implementing and helps to see if the system is working properly.

Table 3. 1: Test cases for proposed system

Test Case #	Test Case Description	
1	Check background music and sound effects	• ON/OFF sound • On/OFF background music
		Verify if sound effects are in sync with action
2	User Interface	Check • Landscape • Portrait mode
		Check • Animation • Movement of character • Graphics • Zoom In/Out (all gestures)
3	Performance	Check • Loading time of a game
		Make sure no action takes a considerable amount of time, game flow should be fast
4	Score	Calculation of the score
		Check • Score registration functionality
		Check • Level finish synchronizes with score

3.2 Tools and Technologies

3.2.1 Technologies

- **Virtual reality -** The main technology that implements our game is virtual reality. Virtual reality technology is a three-dimensional (3-D) artificial environment that is applied to computer games. Virtual reality experiences are developed with VR software and presented to the user in such a way as to simulate the real-world environment, create illusion suspension and help the user experience the VR environment as real.

- **3D Modeling -** 3D modeling is the process of creating, using specific software, a mathematical representation of any surface of an object in three dimensions. The 3D modeling process creates a digital object which can be fully animated, making it an important technique for an animation of characters and special effects.

- **Full Motion video -** Full Motion Video (FMV) games are video games that rely on pre-recorded TV or film quality recordings and animations instead of characters, vectors or 3D models to represent game action.

- **Game Audio -** We can make, hear and tweak sound effects and behaviors while playing the game. It features an audio authoring tool, and a cross-platform sound engine that allows audio on - the-fly.

3.2.2 Tools

- **Unity -** Unity is the best platform for game play development. Unity use to create and deploy high quality 3D and 2D games across the console, via smartphone, VR / AR. It's a cross platform game engine.

- **Android studio -** Android Studio is Android's official IDE. It offers Android developers personalized applications including tools for rich code editing, debugging, reviewing, and profiling.

- **Adobe Photoshop -** Adobe Photoshop is a basic apparatus for designers, visual specialists, and inventive experts. It is broadly utilized for picture altering, modifying, making picture arrangements, and adding effects. Computerized or scanned pictures can be altered.

- **SQLite -** SQLite is an open-source relational database for example used to perform database procedure on android gadgets.

- **Adobe illustrates -** Adobe Illustrator is utilized to make an assortment of advanced and printed pictures, including cartoons, outlines, charts, diagrams, logos, and illustrations. Illustrator permits a client to import a photo and use it as a manual for follow an item in the photo.

- **Blender -** Blender is a program used for 3D modeling, animation and rendering. Using Blender, you can create a 3d model from scratch, sculpt, rig, texture, animate and render it to still or movie formats. Blender also features its own game engine, and can be extended to support third party render engines.

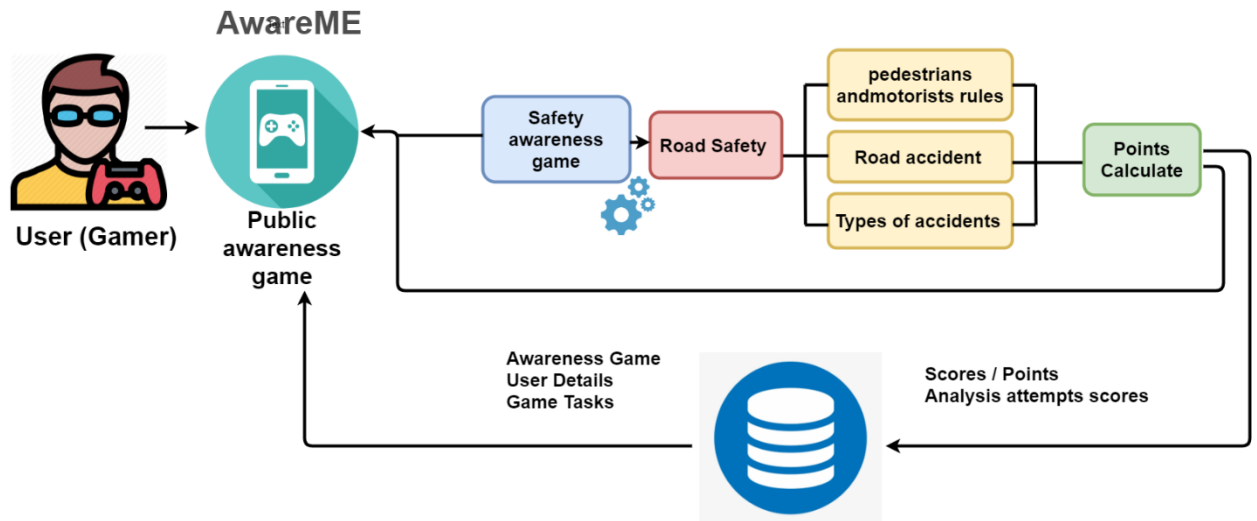## 3.3 System overview diagram

Figure 3 2: System overview diagram in road safety

This indicates road safety in the public awareness game called AwareME according to figure 3.3. The user must initially register and sign in to the game. When playing the game, the program can conduct a test of the player's awareness level. At the end, a score is given so that the player can determine how much progress there should be. Database must hold all documents related to it.
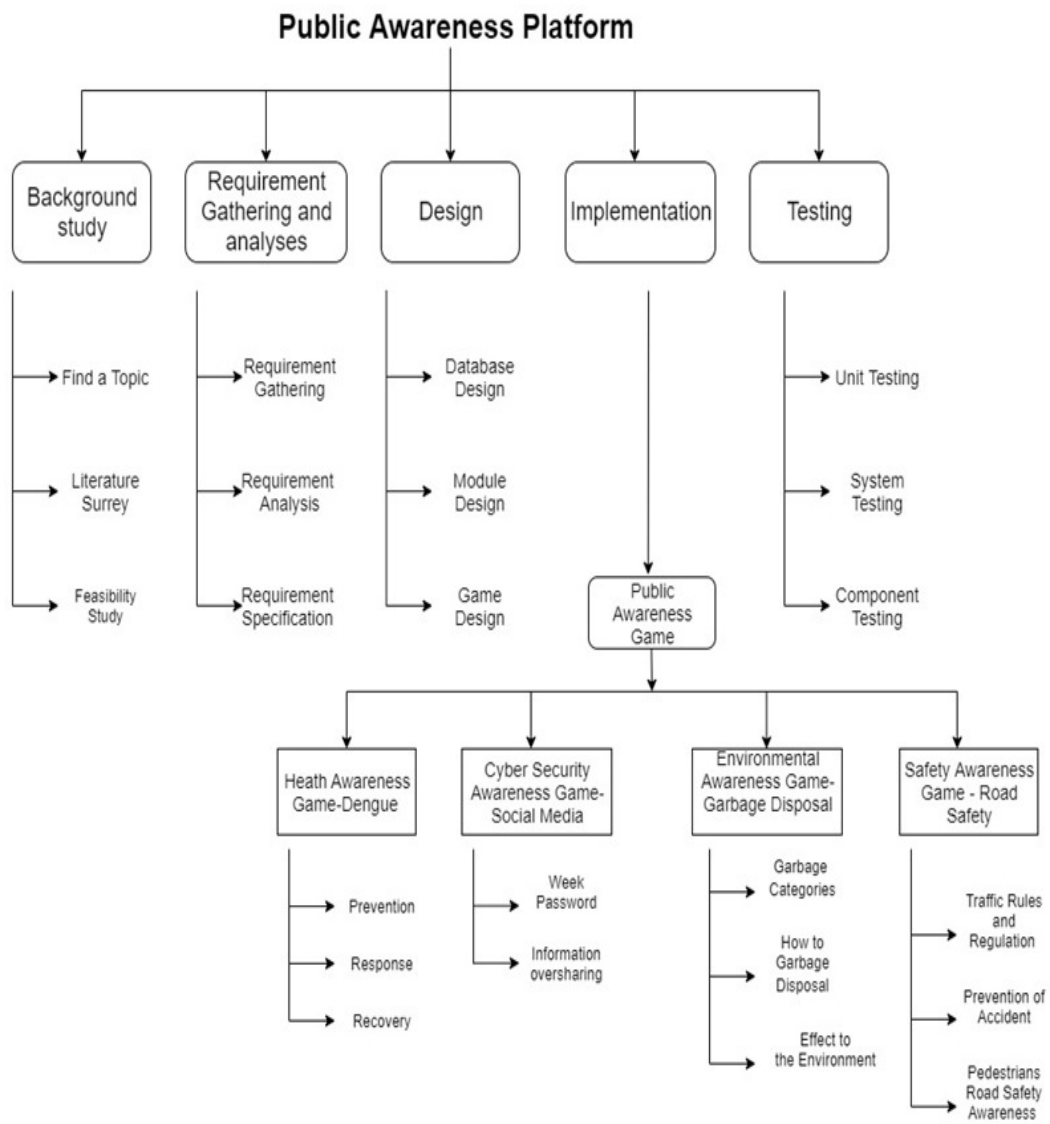
3.4 Work Breakdown Chart

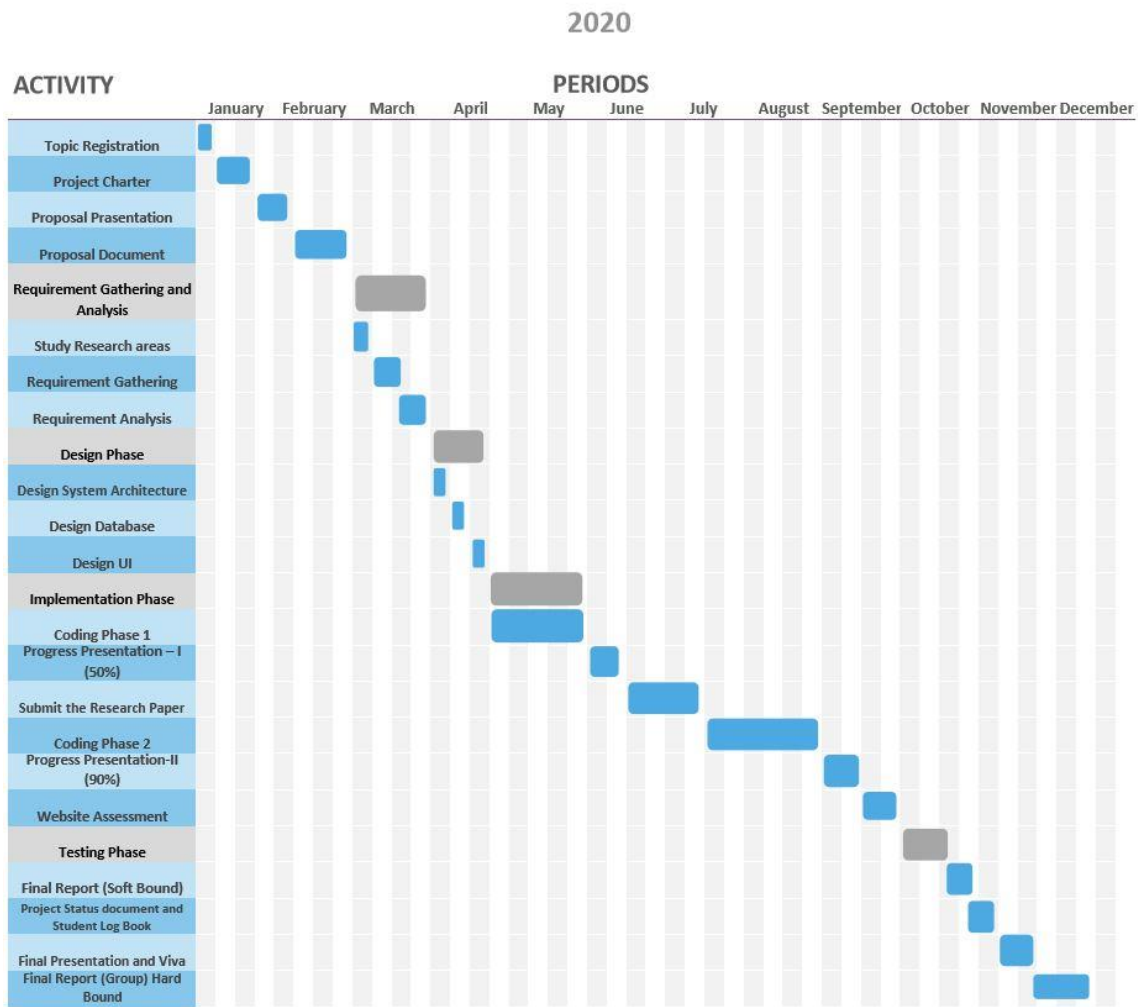*Figure 3.3: Work Breakdown Chart*

3.5 Gantt Chart

Figure 3.4: Gantt Chart

4 BUDGET AND BUDGET JUSTIFICATION

Table 4.1: Budget Table

Requirement	Description	Price per unit (Rs.)	Quantity	Total(Rs.)
Special Software and Hardware	VR Box and Joystick	15000.00	1	15000.00
Documenting and Binding	Document hard copy printings			3500.00
	Binding cost			1500.00
Total Cost				**20000.00**

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