

# Virtual Reality Of IIT Karwar

TEAM NAME:-Brownie

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A large, stylized orange thought bubble with a smaller bubble at the bottom left. The text is written in white inside the main bubble.

How much time it takes you to explore  
a  
humongous campus of 852 ACRES

**Our Solution:** To design a 3d virtual design of our campus that will allow the user to move freely throughout the campus with the means of transport and identify the different structures in campus.



# Phase 1

1. Exploring tools to develop a 3d map.
2. Exploring different components of infrastructure of campus.
3. Designing a basic map of campus.

## Phase 2

1. Working model in VR
2. Defining the objects of map to its finest.
3. Making our map interactive

# Phase 3

- 1.Integrating all components.
- 2.Will Pin objects with information tag to show description of objects like LHC,Mess etc.
- 3.To make alterations for different seasons.
- 4.

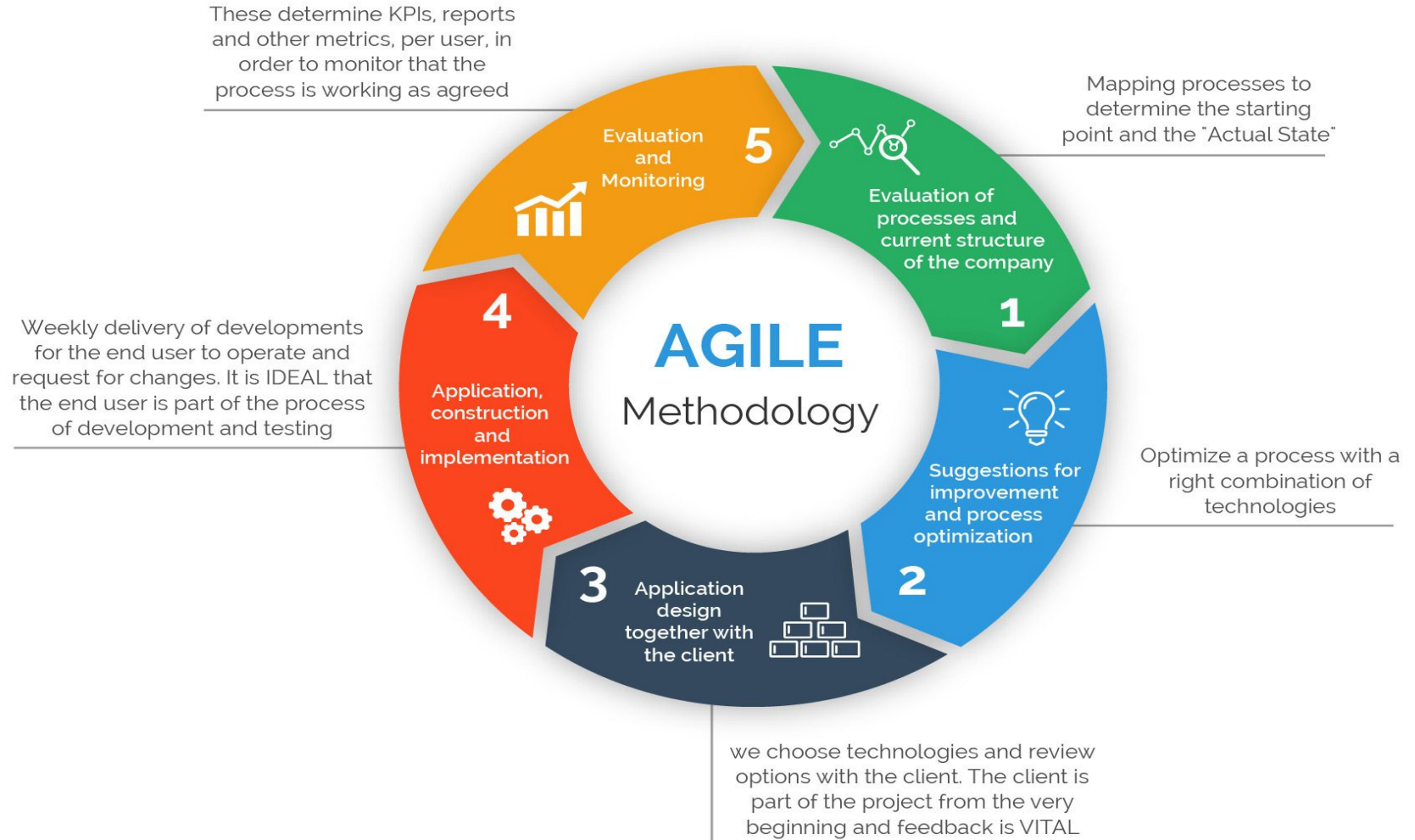
# Agile Development

## 1.Documentation methodology:

The incremental and iterative approach used in Agile management is also applied to documentation.

Using an incremental approach, documentation is completed in smaller amounts, rather than all at once. Using an approach that is also iterative, the process of working on documentation is ongoing and repeated throughout the project.

The thinking behind this methodology is simple: the most valuable documentation is for what is actually built.the goal is to find the point that maximizes the tradeoff between the value of the product and the effort involved to produce it. This same 'just enough' concept is applied to documentation.





# 2.Project Requirements

## Software Requirements

- Blender
- Unity
- Android SDK,CrossPlatformInput,Some Other Libraries.

## Hardware Requirements

- Google CardBoard
- Smart Phone (With Gyroscope)
- Controller (Bluetooth operable)

# 3.Architectural Design

- 4+1 views
- Logical view
- Process view
- Development view
- Physical view
- Use Case
- Gantt Chart

# 3D Map Of College

```
graph TD; A[3D Map Of College] --> B[Buildings (closed Structure)]; A --> C[Roads/Footpath (Open Structure)]; A --> D[Vehicles]; B --> E[Academic s]; B --> F[Mess]; B --> G[Hostels];
```

Buildings  
(closed  
Structure)

Roads/Footpath  
(Open  
Structure)

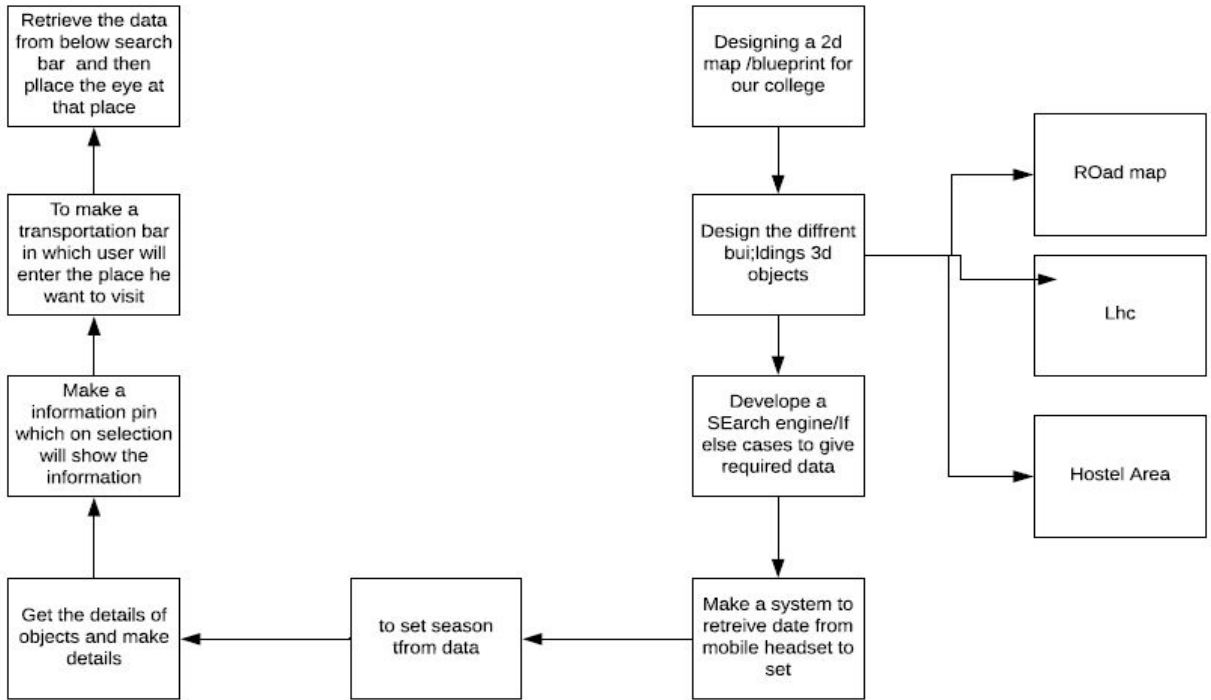
Vehicles

Academic  
s

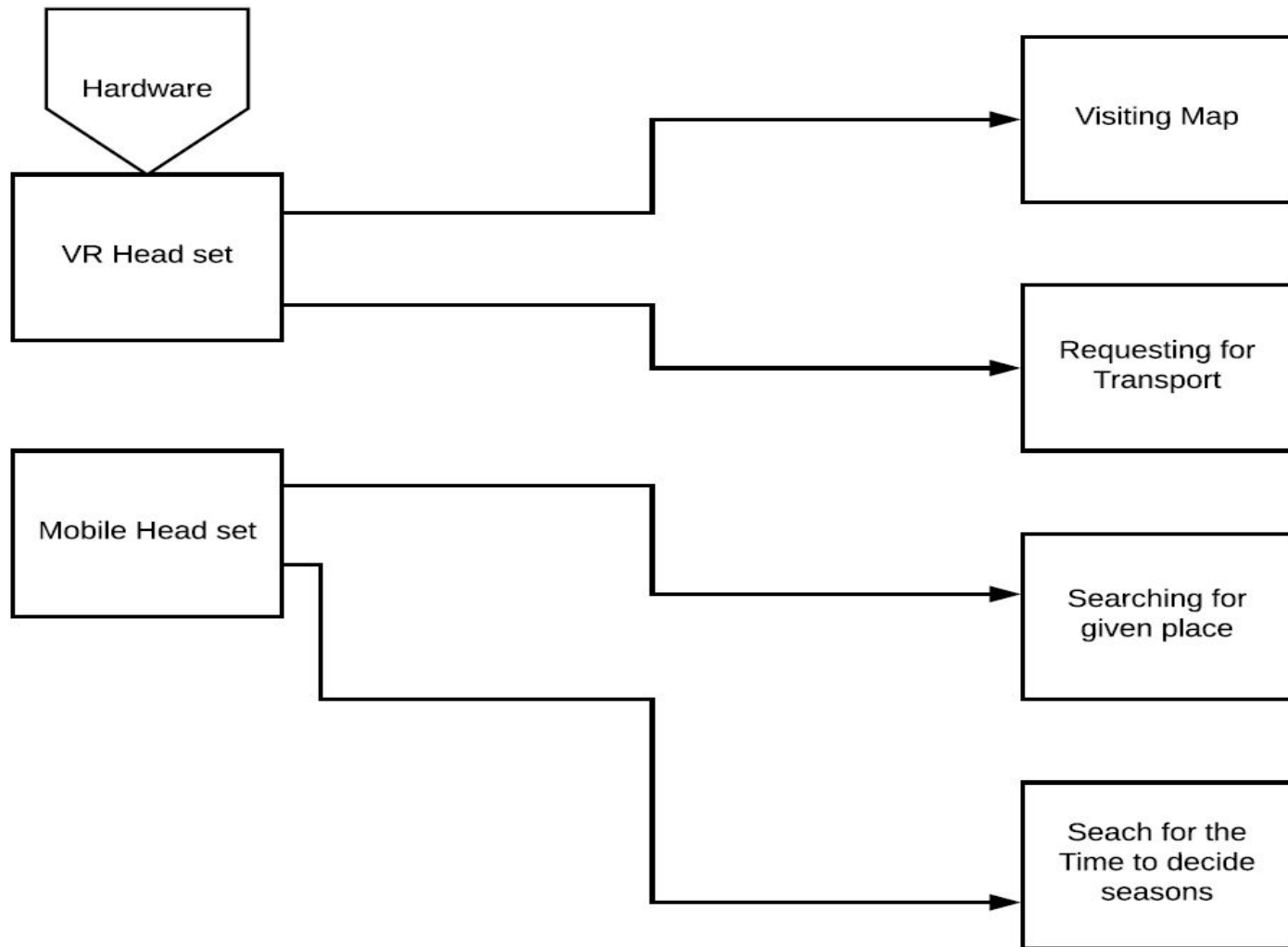
Mess

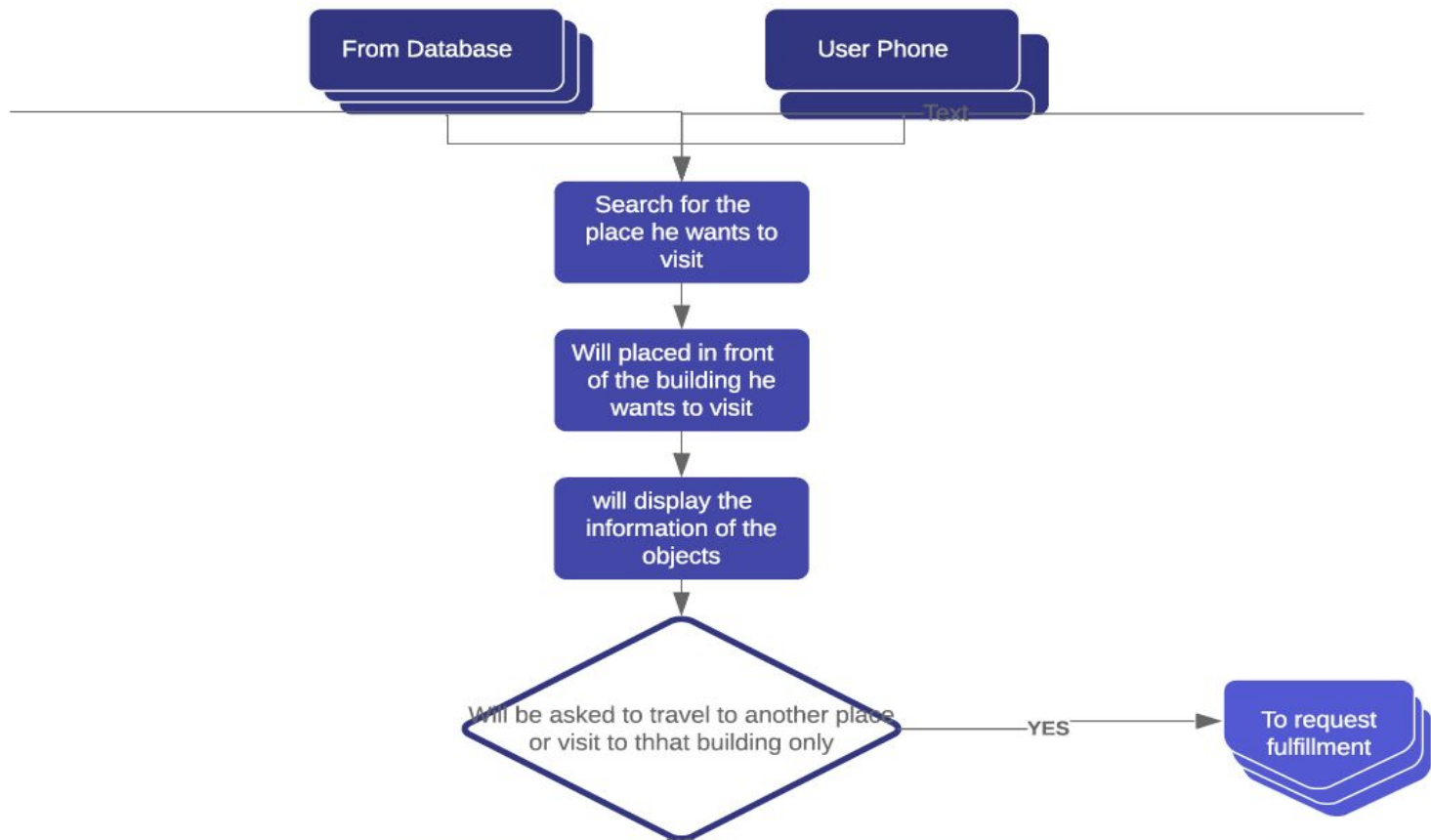
Hostels

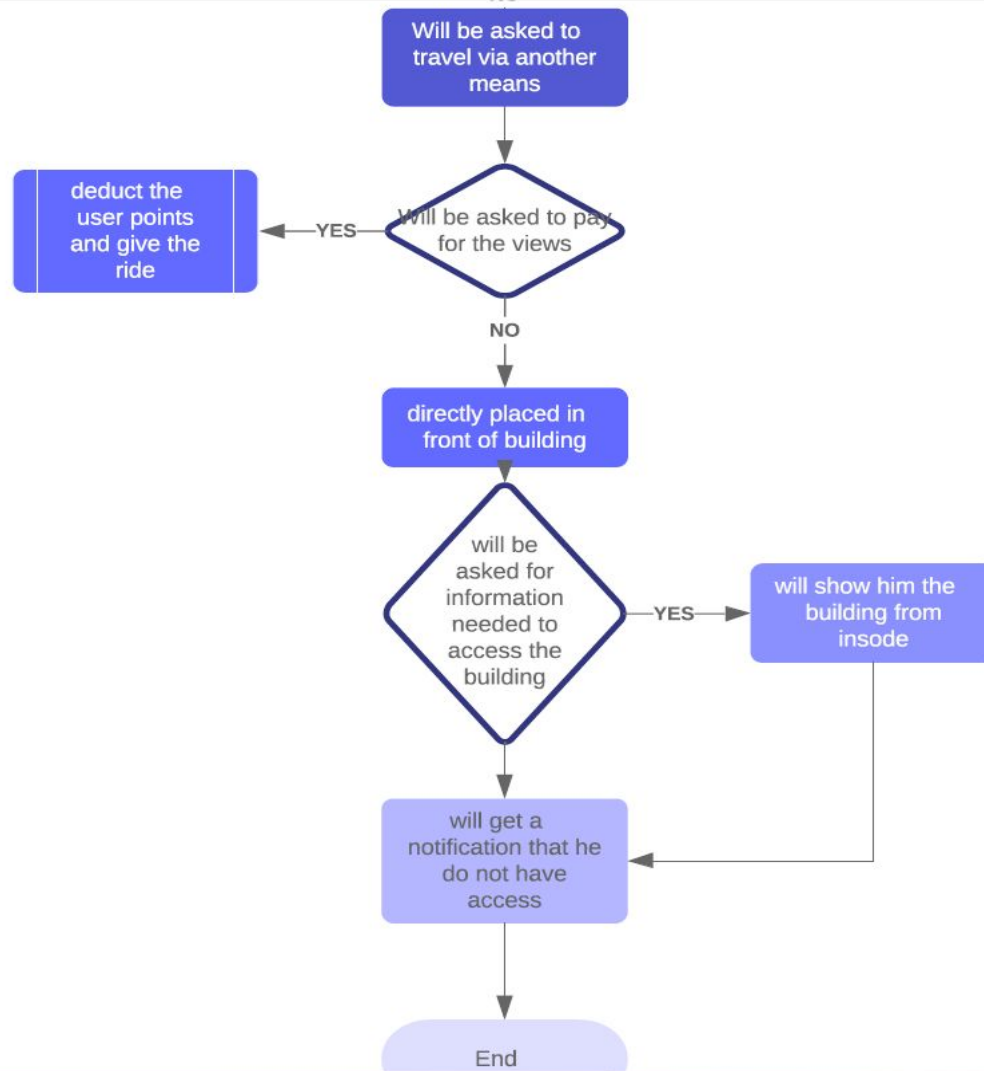
# Developement View



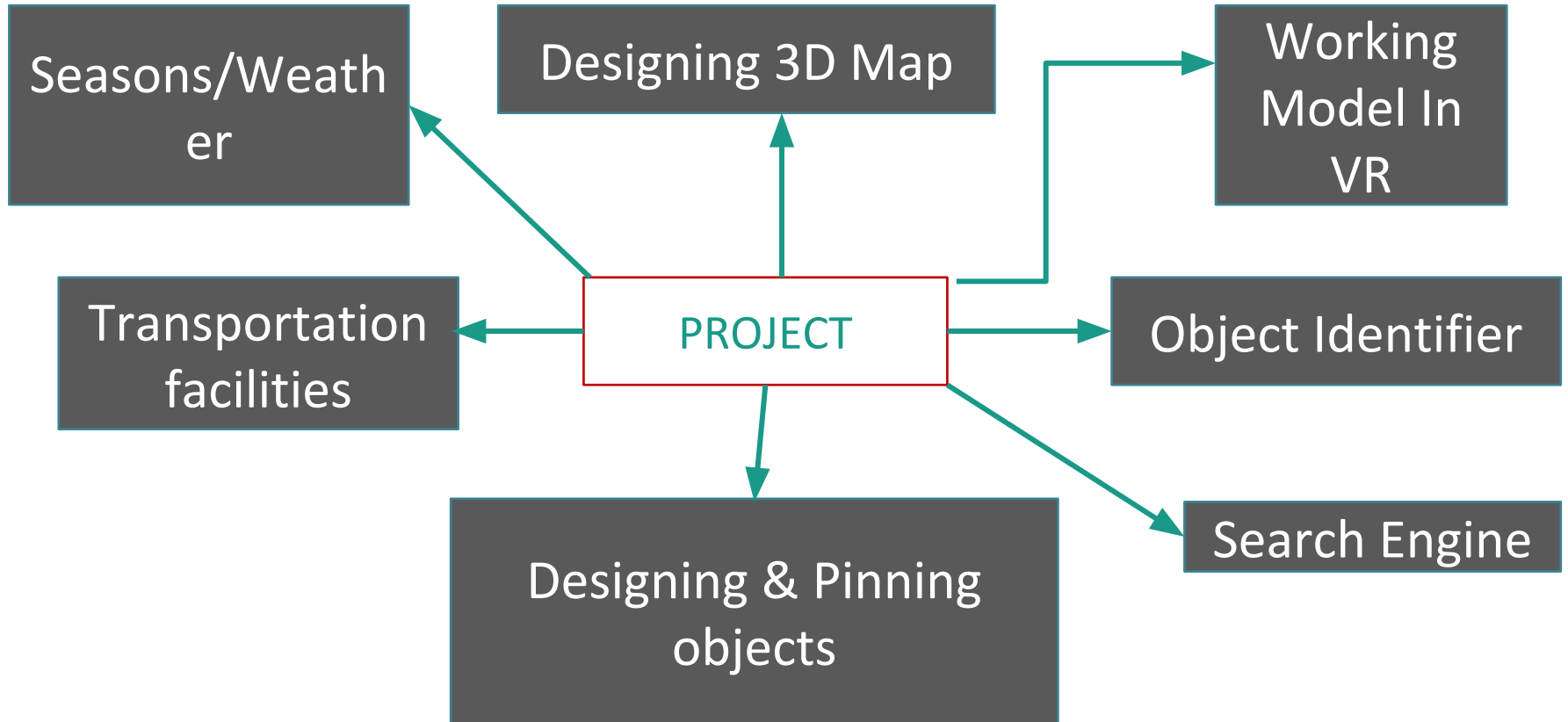
Physical View





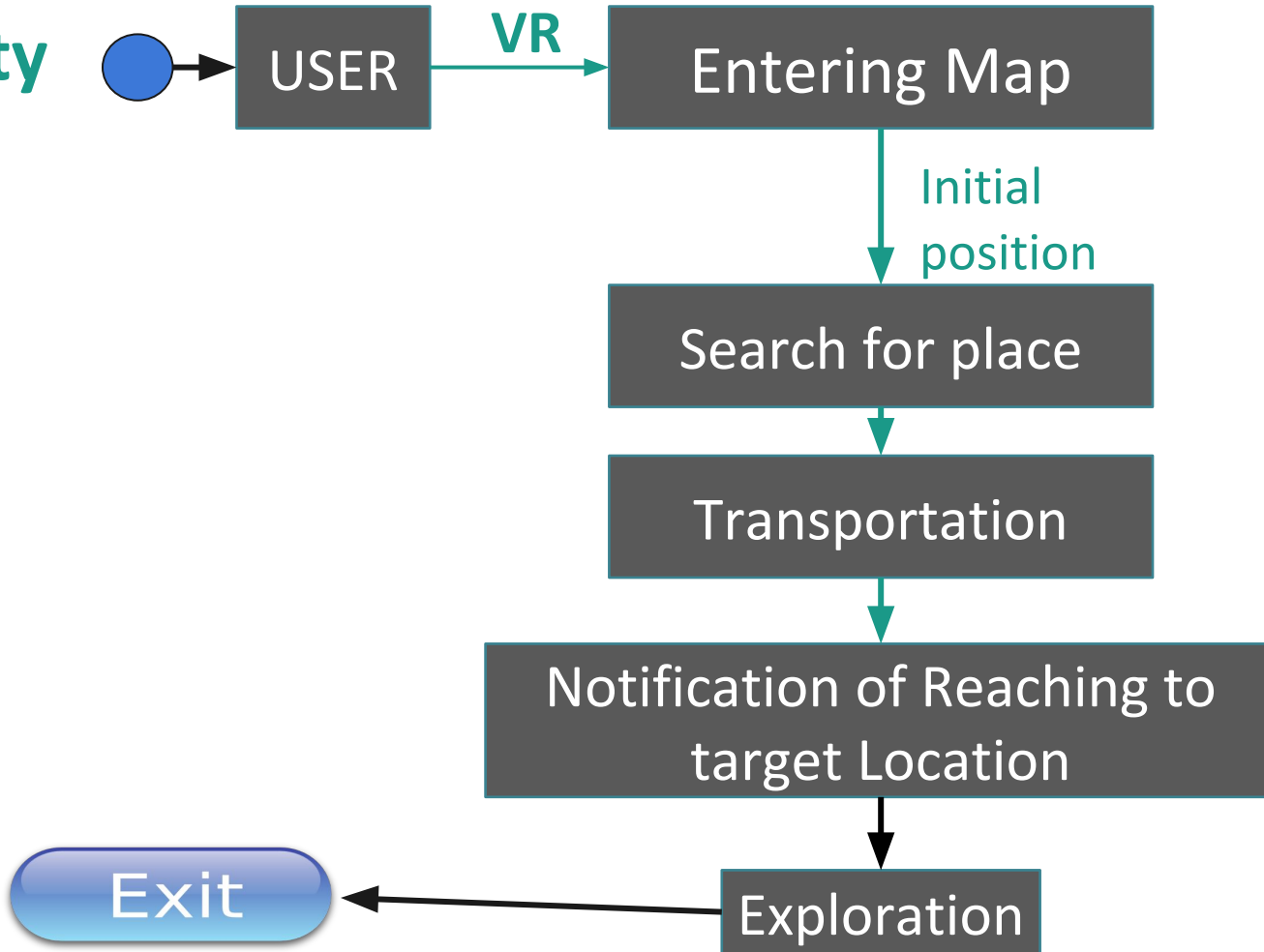


## Basic Structure





## Activity View



# Gantt Chart


VIRTUAL REALITY OF IIT JODHPUR

TO DO	WEEK 1	WEEK 2	WEEK 3	WEEK 4
EXPLORATATOION TOOLS & CAMPUS	✓	✓		
DESIGINING OF BASIC MAP		✓		
MAKING OF BUILDINGS IN BLENDER			✓	
BUILDING FUNCTIONALITIES (OBJECT IDENTIFIER)			✓	
INTERGRATION				✓
WORKING VR MODEL				✓

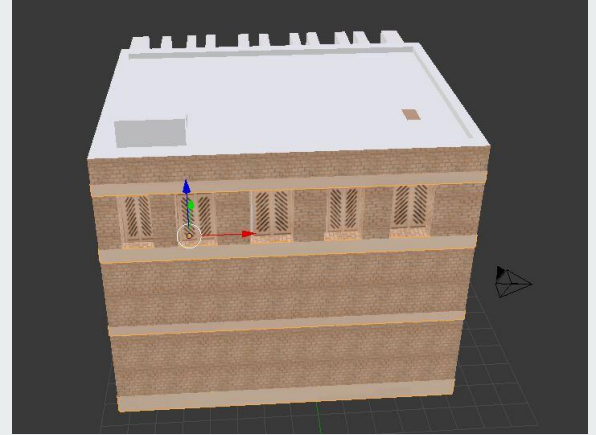
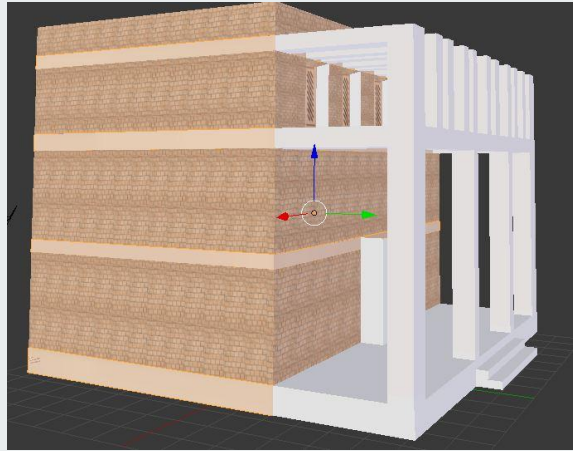
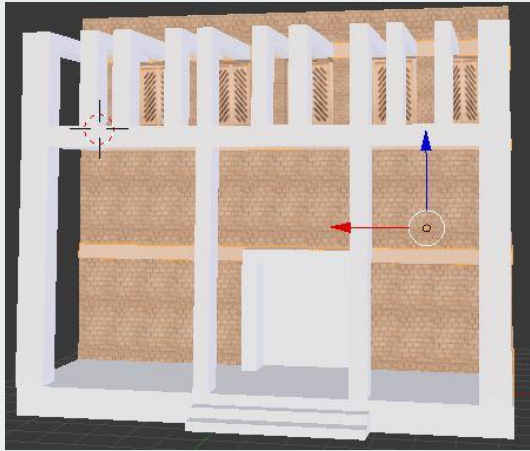


# Development

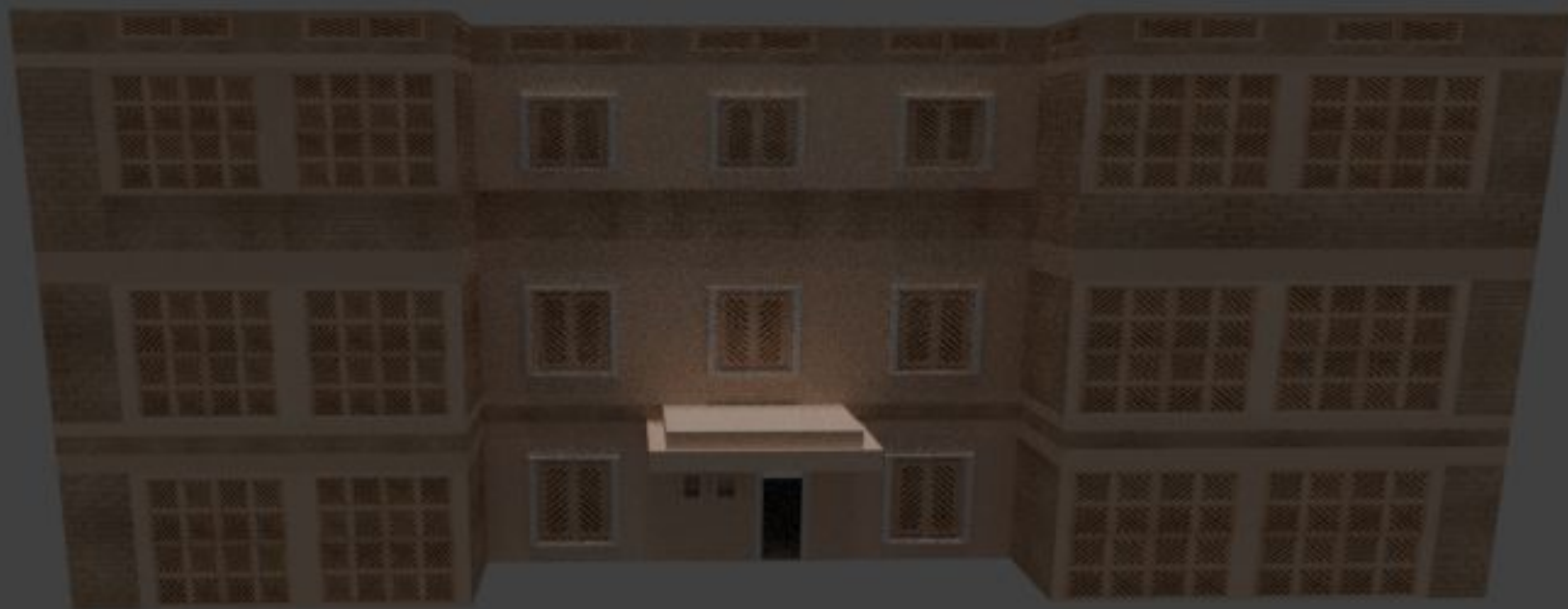
## Describing the development of project in short,

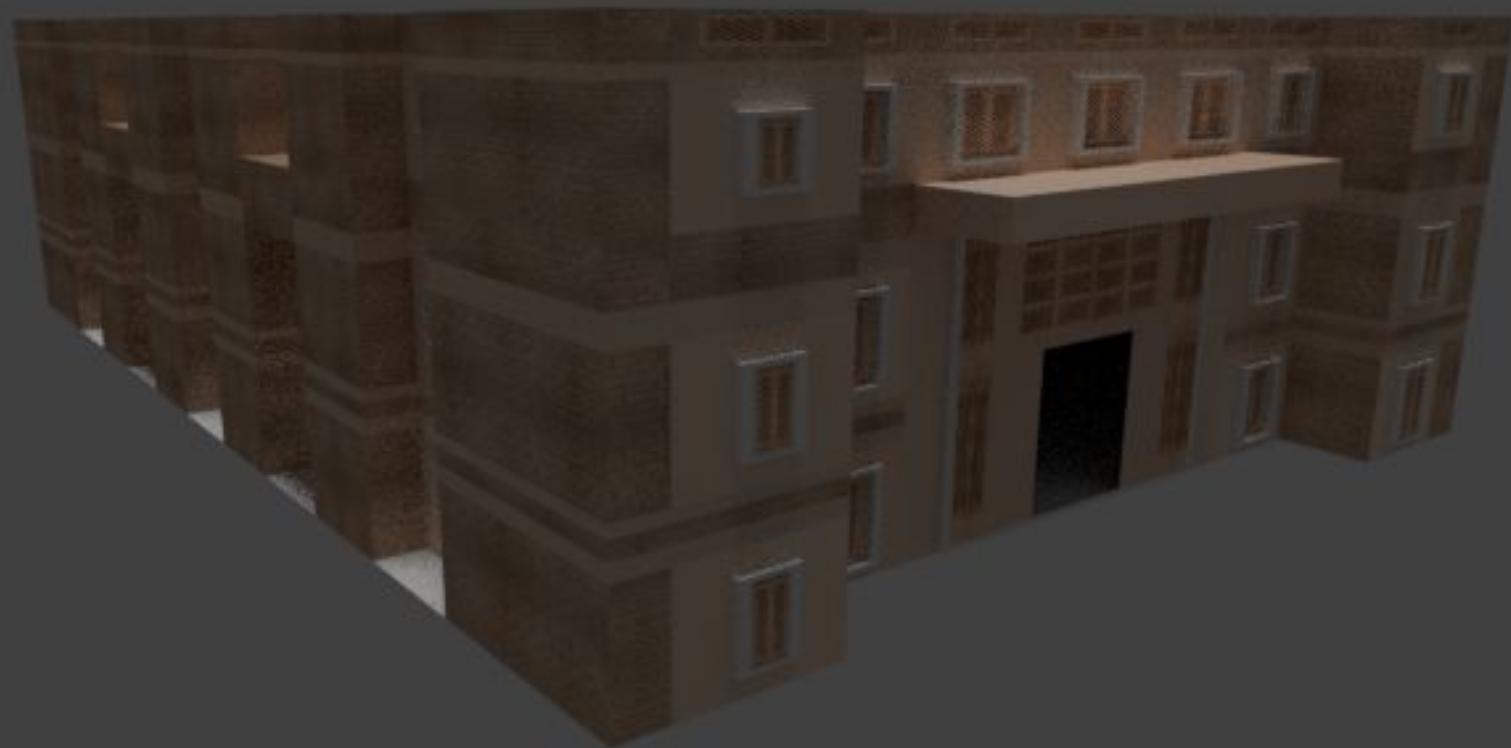
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1. We have firstly made building in blender -> Making of building includes Shaping a cube and then giving image texture to it.
  2. To make our model Google Cardboard friendly we included Google Cardboard package in unity for reference
  3. To include the controller part, we used cross platform input standard asset in unity. This enables us to take input from a bluetooth connected device , and operate our objects in unity .
  4. We used EasyRoads3D package for making/baking roads in Unity .
  5. To deploy our application on android as a apk we used Android NDK in Unity .
  6. To include car we took Free Toy car prefab from unity asset store .

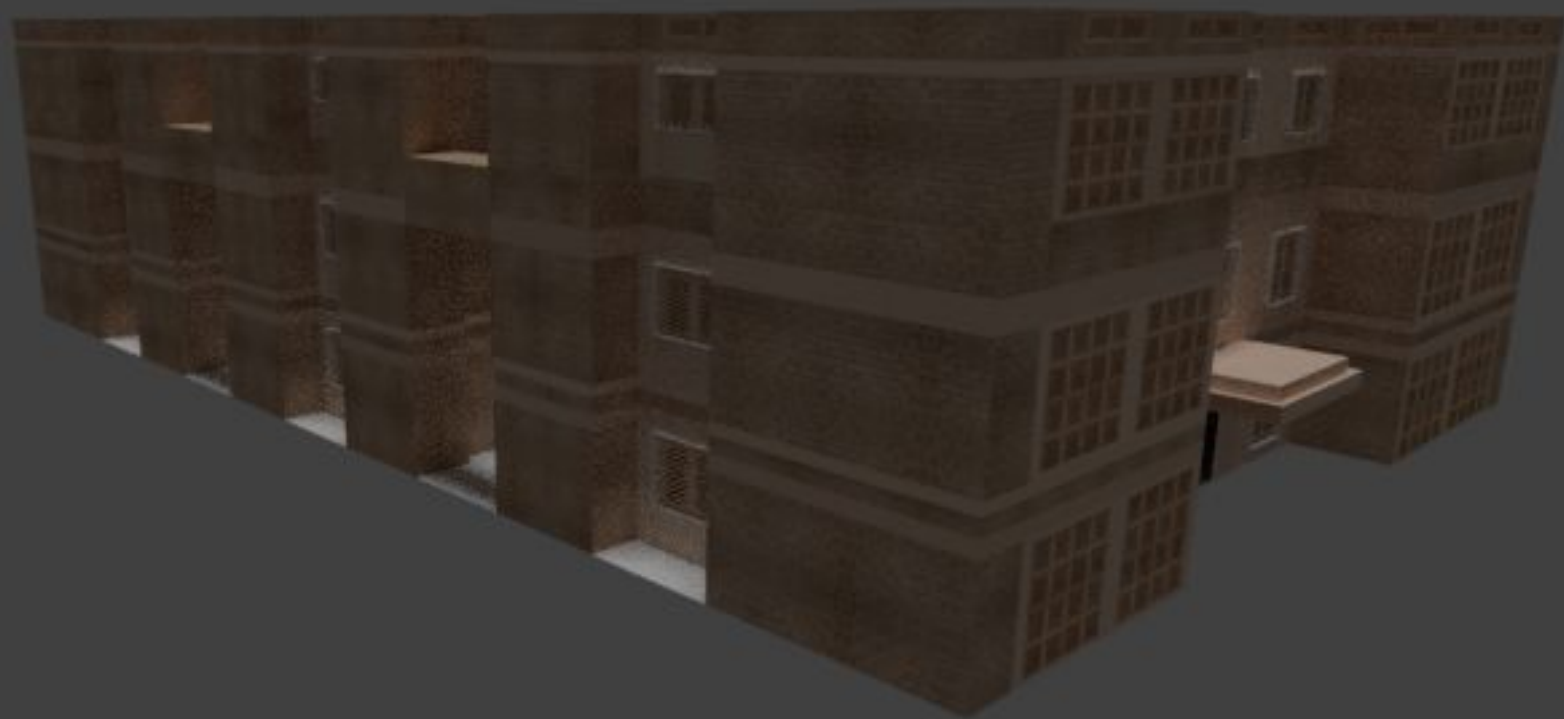
# Blender Models



These are few of the different views of the Library Building of IIT Jodhpur designed using Blender









# Testing

- To test the functionality of the model, we implemented several dry runs.
- To check the correct deployment of the Blender models, we rendered them with different conditions of lamp and sunlight.



# Quality Attributes

**Software Quality Attributes in our model are:** Correctness, Reliability, Availability, Maintainability, Readability, Extensibility, Portability.

# 1. Correctness:

The correctness of our project refers to:

- Agreement of program code with specifications
- Independence of the actual application of the our project.

The **correctness** of our project is especially critical because it is embedded with a hardware device.

- **The results produced by the software system:** The results of our project delivers are clear and in well structured form and is easy to interpret. The software afford the user flexibility with respect to the scope, the degree of detail, and the form of presentation. Error messages are provided in a form that is comprehensible for the user. Also the details for the buildings are to the point.

## 2. RELIABILITY

- **Hardware Reliability->**

- - 1-Connectivity issue between controller(VR HeadSet) and main Device.
  - 2-Probability of components failing is very low.
  - 3-In case of failure if hardware is not totally damaged then we have to restart the device.

- **Software reliability->**

- - 1-One time rendering.
    - 2-How likely is it that a software component will produce an correct output?
- Ans-**99.99%**(Depends on hardware specifications of device)

### **3. Availability**

To increase the probability of that the system will be up and running and able to deliver useful services to users.(The peoples may not be having good systems, so to scale up the project,we can use following techniques)

- 1-Use Peer to peer Edge Computing for Rendering.
- 2-Use of local Server for rendering.
- 3-Use of Cloud Offloading.

## 4. Safety and Security

1. The components of our project are extremely safe and secure as it deploys the programme offline.  
(we can do it online but in preliminary stages that we have planned there is no such interdependence to internet)
2. In case of Catastrophic Failure
  - a. Restart the software
  - b. Reinstall the software
  - c. Restart Device and try above steps
  - d. Buy some expensive device(device with better RAM and performance)
  - e. **Ask For Feedback**

3-Wear VR Headset in open Ground

4-Use Embedded VR Headset

## 5. Maintainability:

Maintainability = suitability for debugging (localization and correction of errors) and for modification and extension of functionality.

The **maintainability** of a project depends on its:

- Readability
- Extensibility

## **6. Readability:**

- Form of representation is very clear programming is indented and software is consistent.
- This leads easy understanding of our source code which indeed leads to easy evolution and maintainability.

## 7. Extensibility:

**In our case:** Extensibility allows required modifications at the appropriate locations to be made without undesirable side effects. Extensibility of a our application depends on its:

- Structuredness (modularity).
- Possibilities that the implementation provides for our purpose.
- Availability of comprehensible program documentation.



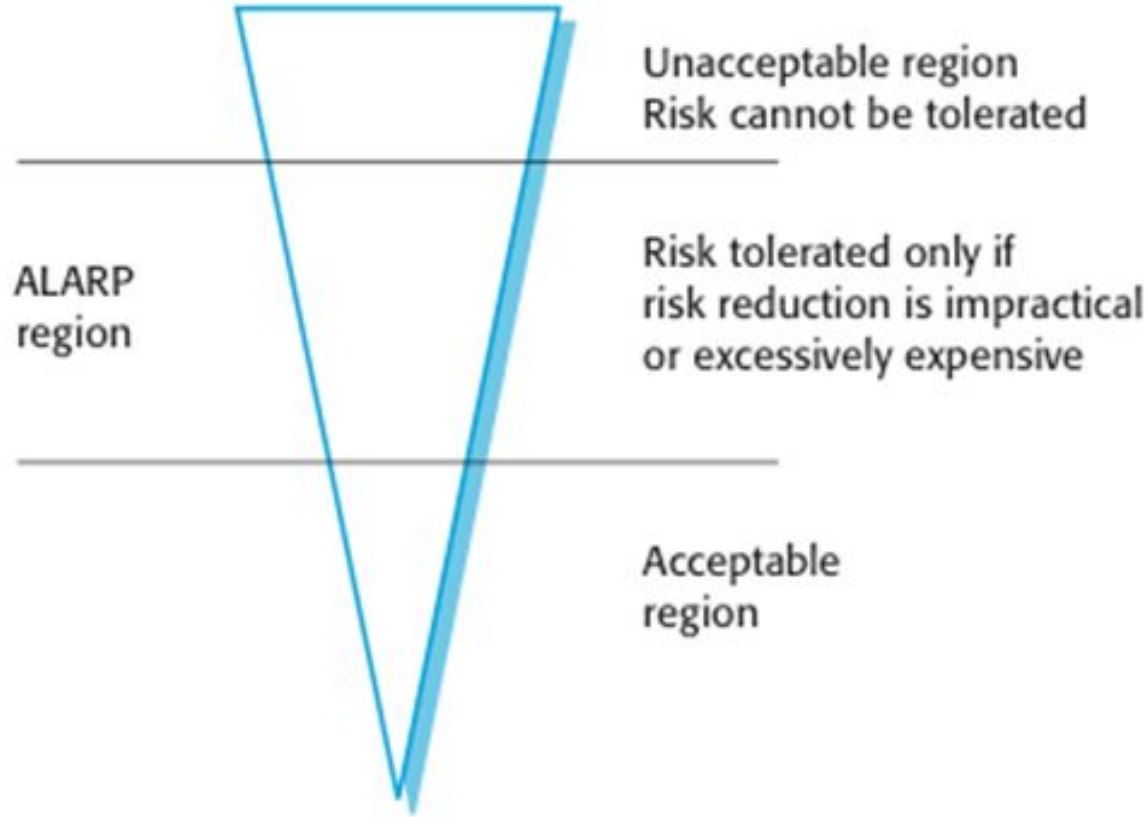
## 8. Portability:

Our model gives you ease of installation for all devices and not only for those it is designed on.

The portability of our system is assured on basis of:

- Degree of hardware independence
- Implementation language(C#)
- Extent of exploitation of specialized system functions
- Hardware properties
- Structuredness: System-dependent elements are collected in easily interchangeable program components.

The effort required for porting it proves significantly less than the effort necessary for a new implementation.



Our Project lies in acceptable region because:

1. It do not effects a large number of peoples
2. It is a standalone application
3. It don't have large number of stakeholders involved.

Thank You