Software Requirement Elicitation

On

Smart-Home System

(Guided by Prof. Srinivasan)

Prepared By

Aparna Kavalgikar (90126)

Disha Upadhay (89715)

Shweta Sahu (90525)

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ACKNOWLEDGEMENT

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We would like to express our heartfelt thanks to members of our project for their involvement and contributions throughout the project in accomplishing the tasks assigned.

PREFACE

This document describes the Smart-Home System Requirement Elicitation. Today's world is of smart people, smart devices for smart people. Everything happens on single click. This book is for all readers who is beginner or expert in software requirement elicitation and IoT. We have given our best to cover all basic needs of current human life. Requirements for Smart Home are going to get complex as you move further into this domain. The structure of this requirement document is based upon IEEE Standard.

DOCUMENT REVISION HISTORY

RATIONALE	DATE	VERSION	MODIFIED BY
Initial Draft	09/23/16	V0.1	Aparna Kavalgikar
Added Project Concept, Problem Solved	10/10/16	V0.2	Aparna Kavalgikar
Added Interview Technique	10/11/16	V0.3	Disha Upadhyay
Added Functional requirement	10/25/16	V0.4	Disha Upadhyay
Added JAD session	11/15/16	V0.5	Disha Upadhyay
Added Stakeholders and Motivations,	10/11/16	V0.3	Shweta Sahu
Added Non-Functional Requirements	11/15/16	V0.5	Shweta Sahu
Added Planning and Process Model	12/10/16	V0.6	Shweta Sahu
Added Use Cases and Prototype	12/15/16	V0.7	Aparna Kavalgikar

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Final review and formatting done	12/18/16	V0.8	All
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GLOSSARY

JAD – Joint Application Development

UC – Use Case

R&D – Research and Development

INTRODUCTION

Home automation began with labor-saving machines. Self-contained electric or gas powered home appliances become possible in 1900s.Technology has evolved day by day and still improving. In today's smart world everything is instant, fast and smart. Imagine that you can control lights, microwave, dish-washers and washing machines from your office. Amazing isn't it. Humans will be able to focus on things they are interested in, which are creative rather than just daily routine "not so productive" tasks. While building these smart systems, there are three importance factors need to consider are: Convenience, Security and Savings.

PROJECT CONCEPT

PURPOSE

An automated home is about the convenience of saving your time and effort by setting up your home to automatically do routine functions – such turning lights on and off, setting the thermostat, operating dish washers, washing machines, entertainment devices, closing curtains etc. Home automation offers the security of knowing your home will alert you if anything is suspicious and you can even track on your home activities from anywhere in the world. A bit of technology can make for a safer and healthier living environment!

SCOPE

Smart-Home System provides controlling all lights. Program entire lighting scenes indoor/outdoor with one button push

Control security. Program burglar alarms, smoke detectors, locks

Control temperature, air conditioning of the all rooms

Control TV, Home Theater, speakers by using your cell phone

Control Sprinkler for watering indoor/outdoor garden plants

Control opening and closing of window/door curtains

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PROBLEM SOLVED

Saving time and effort by using Smart-Home System to do routine functions automatically

Security of the home is more efficient, get an information immediately by SMS/Email if someone missed you, or something suspicious is happening

Save money by using all appliances only when needed. For e.g. Sprinkler program will automatically stop the sprinkler, which saves water wastage which usually happen cause if sprinkler is not turned off once feeding is enough.

Save energy by using lighting control system. For e.g. One may forget to switch off lights when going out of home, use light control system to turn lights off from your cell phone.

EXPECTED AUDIENCE/STAKEHOLDERS AND THEIR MOTIVATIONS

NAME	MOTIVATIONS	CONCERN
Home-Owners	- Making lives more convenient, comfortable, safe and energy-efficient: - Replace turn on or turn off on switches by hand for current product, (system to be controlled by voice), - Set up systems in the home which can turn off the lights by voice when hands are occupied, - Switch of lights using timer while reading a book at night - Switch on the lights in front or back of house when an intrusion is detected, and trigger an alarm,	- No access to the smart home system if there is a malfunction with internet service at home - No access to the home system if located in no network coverage zone - No access if there's a blackout in the region with no power - Smart home system malfunctions and triggers a dangerous fiasco - System is not reliable and fails intermittently

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	• Monitor home security from any part of the world. • Switch off appliances when on one's at home. • Trigger safety alarms and smartphone notifications if smoke alarm is triggered. • Switch on/off air conditioning, TVs, water heater, etc. through smartphone while going in/out of house • Play songs of choice from any part of the house without running to a computer or sound system.	
Gardeners	• Turn off the water supply with one touch phone. • Switch on the garden lights after dusk until night • Trigger automated water sprinklers during a specified time of day.	• The water sprinkler system malfunctions and leads to huge wastage of water destroying plants and flowers. • The system doesn't trigger sprinklers and plants die
Kids	• Serve a safety hotline (video/audio interface) to parents or guardians when needed • Do not enable unsafe appliances when kids are around • Trigger alerts or notifications when a door or window is open • Provide a safety alternative to call 911 or emergency services when in danger and parents	• The security system fails intermittently and kids do not have means to contact parents or other emergency services.

	aren't around	

SOFTWARE ELICITATION TECHNIQUES

Elicitation techniques we have used are as follows

- Interviews

- Joint Application Development

- Use Cases

- Prototyping

Finalized Use cases and Prototype is described in the section of System Models.

INTERVIEWS

An interview is a discussion with stakeholders to elicit or confirm needs and requirements. An interview session may involve one or more stakeholders to understand requirement are gather in right fashion and all stakeholder expectation towards the project and vision are on same page. The interview may also in format of question and answer session used to find out other potential stakeholders and any discrepancies between needs or difference of opinion; the high-level requirements derived from those needs; and the resulting detailed requirements. Interviews provide confirmation from stakeholders on their needs, requirements, and any changes that can be executed in initial stage. These helps for the better understanding and correct way of gathering requirements of the project.

The Interview session will be conducted by business analyst may be responsible for identifying stakeholder or collecting list from team for getting the list of stakeholders. Business analyst is accountable to conduct the meeting and be ready with accurate questionnaires related to subject. Business analyst should make sure that before the meeting should share questionaries' through email or mail. The best practice is that while asking questions business analyst should make detail notes and record the session also information gather must be rightly understood. There will be no chance for assumption. These will help in taking right decision for gathering requirements or any important task in the project. Business analyst play a

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liaison between business team and development team for gathering right information and documenting accurately.

For example: Smart-Home System device user account information can be shared for how many additional members? What is scope of project?

STAKEHOLDER:

The stakeholder can be any business owner of the project or subject matter expert one who is responsible for providing their needs, expectations, priorities, and constraints. They are one who can also validate the results of the interview.

INTERVIEW PROCESS STEPS:

1. Identify stakeholders to be interviewed, prepare questionnaires and sent them before the meeting

2 Acquire a general understanding of the client business

3. Make sure that interview questions must be used open-ended questions techniques

4. Schedule meeting time and venue for the interview to be conducted and informed to stakeholder

5. Submit a set of questions to interviewees before the interview (mention questionnaires in email)

6. Mention about Recorders in email so it will help in meeting to accurately preserve results of the interview

7. Share results to interviewees for confirmation of content and correct understanding for scope of the project

OUTCOME

Interview technique will achieve the goal of gathering accurate information from stakeholder. It will help to get correct information from right source and know expectation and scope of project.

JOINT APPLICATION DEVELOPMENT

In software project, there are many situations where business analyst applies the technique of JAD. Depends on situation these will be most helpful technique for getting accurate information.

For example: Collaboration between stakeholder and system analyst to identify requirements in a focused manner. Sometimes in software team JAD techniques is conducted by business analyst to solve the issues between developer and Quality assurance team.

Smart -Home system JAD technique will produces relatively large amounts of high-quality information in a short period. This technique will surely give a forum to explore versatile points of view for topic and opportunity to discuss it in depth.

STAKEHOLDER

The contribution of stakeholders in the JAD session is essential for project completion. The JAD session will not be productive and efficient if stakeholders are not involved. The main reason behind JAD session is to make sure stakeholder and performing organization comes in one roof in a structured environment.
 Stakeholders involvement and ownership in the product or service development is possible if a JAD session technique is used. These will help actual idea to develop into software and progress of each iteration will be observed by them

EXECUTIVE SPONSOR /BUSINESS ANALYST

Management contribution is necessary for any needs or requirements gathering process to fulfilled and complete. It is essential for the JAD session team to have a management sponsor. The executive sponsor may be a manager of the business administration area whose needs and requirements are being specified at the JAD session. Not necessary executive sponsor must actively participate in every JAD session. Executive sponsor can attend the first JAD session for team support and last JAD session to review the achievements and make comments. Sponsor should be available if there is any big issue in team. Business analyst can conduct JAD meetings throughout project and can work closely with sponsor and update them with current progress of the team.

JAD PROCESS STEPS

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1. Specify each session: Mention purpose, scope, and goals of the JAD session, choosing JAD team, invite and confirm stakeholder presence in predefined schedule of JAD. It is essential to get management commitment to regularly observe team work and give accurate information and guideline to team

2. Research and investigated Product: Awareness and familiar with the product or service, collect initial information, getting through any models.

3 Compose: Prepare a report any visual aids, generating realistic agenda, the recorder, and specifying venue of meeting.

4. Organizing Session: Focus on agenda to gather and document accurately the needs and requirements. Most essential part is participants are given comfort zone and equally treated during the JAD session.

5. Documents: Prepare the draft of documents. Useful information gather in the JAD session is further filter through analysis efforts, asking open questions or issues sorted out through the sessions are resolved, and stakeholder received final document to review and approve

OUTCOME

JAD technique which will be used in Smart-Home system to solve the issues between different team or different opinions between business team and technical team.

SYSTEM REQUIREMENT SPECIFICATIONS

Functional Requirements of Smart-Home Systems includes:

FUNCTIONAL REQUIREMENTS

Table 1: Functional Requirements

ID	DESCRIPTION	TYPE	PRIORITY
FR1	Challenges in maintaining different functionality of smart home control panel light control, security control and Monitoring, Temperature control, Sprinkle control, Entertainment control and Curtain control.	High important	P1
FR2	Understand customer privacy and confidential setting through smart home control panel	High Important	P1
FR3	Create free Online portal for users /operator Access the system outside the home is possible	High Important	P1
FR4	Maintainability for smart home system control sprinkle functionality set the time, select time, set duration, run time, stop and display fire sprinkler status	Average Important	P2
FR5	Maintainability for smart home system security and monitoring control alarm /door alarm/backyard camera/Thief alarm /Patio alarm functionality set the time on & off select time, set duration, run time and stop time	Average Important	P2

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FR6	Maintainability for smart home system for light control different rooms light/control different entertainment system functionality set the time on /off living room, kitchen, study room & return to home function. In entertainment try option turn selected speaker, set volume and select mode	Average Important	P2
FR7	Maintainability for smart home system inside temperature functionality set heat/cooling/Turn fan. Display outside and inside temperature & humidity	Average Important	P2
FR8	Maintainability for smart home system set curtain operating functionality set different room/open room curtain as per setting /close room curtain as per setting	Average Important	P2
FR9	Collaboration with third party with different safety service	Low Important	P3
FR10	Collaboration with distribution network for different functionality sprinkle agency	Low Important	P3
FR11	Access by one user and password on multiple device	Low Important	P3
FR12	Require Hardware (space) to store database for viewing different functionality. So, customer can use app for their smart home control information	Average Important	P2
FR13	Quality of usability and speed or buffering on website must be maintain	Average Important	P2
FR14	Portal must be design in user friendly way	Average Important	P2
FR15	Require R& D team to regular survey on product or innovation of product	Average Important	P2
FR16	Users/Operator of the application or system need to sign up to use the service	High Importance	P1
FR17	User must receive send alerts and notification	High	P1

	from the system	Importance	
F18	User can visualize different reports on different functionality and help in customize each function as per choice	High Importance	P1
F19	Cost related to security tie up for smart home control system	High Importance	P1

NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements or quality attributes of reference architecture will have an impact on one another. Also, no non-functional requirement or quality attributes can be maximized in a system without sacrificing some other quality or qualities.

There is always a trade-off while choosing the different non-functional requirements. A whole range of quality attributes are proposed by various researchers, as well as international standards. Fortunately, these sets of nonfunctional requirements relate to the same concepts.

System performance: availability, performance, and short-term scalability

System control: security, maintainability, and manageability

System evolution: flexibility, portability, and long-term scalability

Following table shows a list of non-functional requirements pertaining to the Smart Home System.

Table 2: Non-functional Requirements

ID	DETAILS	TYPE	PRIORITY
NF1	Visual displays of temperature, humidity, contact sensors and power switches shall be refreshed every 5 seconds.	Performance	High

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NF2	The sensors for environmental conditions including mentioned in NF1 shall have a minimum data acquisition rate of 10 Hz.	Performance	High
NF3	All sensors and controllers should be within 100 ft. of the master control to pair up wirelessly to the system.	Performance	High
NF4	The smart home system should be highly reliance with maximum failure rate of 1 per 10,000 operation hours.	Reliability	High
NF5	The smart home system should incorporate backup and recovery mechanisms. It will back up all system data on a daily/weekly basis as set at setup time.	Reliability	High
NF6	Upon failures, the recovery mechanism should restore system data from most recent backup	Reliability	High
NF7	The system shall incorporate exception handling so that the user can understand the message when a fault or error occurs.	Reliability	Medium
NF8	Extremely high reliability is the utmost safety requirement. Keeping a strong check on system performance/health and engaging backup mechanisms in case of failures.	Safety	Medium
NF9	The system shall provide user account authentication and information encryption over internet through security layers.	Security	High
NF10	The system should ask for login name and password before changing system settings.	Security	High
NF11	The development of smart home system should incorporate provisions to support system maintenance. The requirements should be documented along with software design. The IEEE standards in accordance with Homeowner Coding	Maintenance	Medium

	Standards should be used.		
NF12	The Smart Home System shall provide users with online document about the system installed in their homes. The documentation should include optics on FAQs (Frequently Asked Questions), Technical support platforms., how to use the system and troubleshoot, etc.	User Documentation	Low
NF13	The reporting of the project should be in IEEE standards and its diagrams should be drawn in UML standards. The interface between the system components should be well described to make the user control easier	Design	Low
NF14	As an environment constraint, master controller software should be developed on Linux system	Design	Medium

TECHNICAL SPECIFICATIONS

Figure 1: Technical Specifications

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Centralized Smart - Home System where report is integrated from different functionality like safe security control system of house, Sprinkler system, Light control system, Curtain operating system and Temperature control system. Functional requirement will assist app how to pull protected data and show the visualize graph with accurate customize information to its user. It shows detail information of each rooms and give control and management through Smart-Home System (Living room, Kitchen, Study room, Patio etc.), Total Control (Security through cameras, Sprinkle water daily bases in garden as per set time, Control temperature as per customized setting). Total comfortable life with Smart-Home System equipment and facilities. In requirement phase it shows detail.

ACCOUNT DETAILS

Ability to edit account details/reset password and add new member control power Enter information's through option "Sign In" and "Sign out". It provides ability to view all facilities report and highlight if the expense amount exceeds facilities or someone abusing safety of house. Functional system of Smart -Home system device will provide excellent usability. If any customized change exceeds agreement of actual expense exceed actual one, it will give notification through email and text every week and every month. Ability to view history with ratio of actual setting and new changes setting that affect and bring satisfied result as per user choice. Graphical view of report will show the difference functional area and its effect.

DATA SECURITY

Password protection with higher data security with 128 –bit encryption Data security module and protocol will be implemented. Cyber security for data will be considered in implementing: third party section, customer section and internal section. Data will be secured and all prevention will be concern as Home safety and personal identification information are involved. Authorized .net is an outline which will integrated with this site. This will help us to identify fraud login information lead to safety. Business model is designed accurately user will land in secure page for centralized Smart-Home system maintaining activity it will provide verified code if device is unauthorized or not same. In these way customers confidence on device and its app will be strongly maintaining.

DATA PROTECTION

Data protection will be high priority as customer provide its confidential as it's related to privacy and personal lifestyle information will be protected by using key lock integration where only co-founder will be allowing to view or edit information on user demand. All the information will not be accessible to any other individual.

INPUT/OUTPUT /ERROR HANDLER

Operating team will be more focus on input in Smart -Home System website and Device; Output of website. They will also handle any error or problems face in domain by user using this application and device. Vulnerability scanning will be done on regular basis using tool of vulnerability scan

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SYSTEM MODELS

USE CASES

Use case diagrams describes a set of actions also referred to as use case. Smart-Home System will be able to perform these functions in collaboration with many external users of the system actors. All the system actors or the stakeholders are provided with some observable and valuable result through every use case.

OUTCOME

Smart-Home System Light-Control

Turn All rooms Lights ON/OFF

Choose Scene Movie, Party, Auto

Increase/Decrease Living room light brightness

Turn Living room Lights ON/OFF

Increase/ Decrease Kitchen room light brightness

Turn Kitchen Lights ON/ OFF

Operator

Increase/Decrease Bed room light brightness

Turn Bedroom Lights ON/OFF

Increase/Decrease Bath room light brightness

Return to Home

Turn Bathroom Lights ON/OFF

Turn Study room Lights ON/OFF

Increase/Decrease Study room light brightness

Figure 2: Smart-Home System Light Control Use Case

Use Case ID	UC_1
Use Case Name	Control Lights
Actor(s)	Members of home
Goal in context	Controlling lights in all rooms of home
Pre-conditions	Application is running properly
Post-conditions	User can control all lights present in all room of home
Basic Flow of Actions	1. Turn ON lights in all rooms on pressing "All On" button 2. Turn OFF lights in all rooms on pressing "All Off" button 3. Select the scene "Movie", "Party", "Auto" as per mood user like to light the room 4. Control individual room by using Individual Unit Light Control Panel 5. Room light panel, turn on lights on pressing "ON" button 6. Room light panel, turn off lights on pressing "OFF" button 7. Room light panel, increase brightness on pressing "+" button 8. Room light panel, decrease brightness on pressing "-" button 9. Room is Living Room, Kitchen, Bedroom, Bathroom 10. Return to Home panel on pressing "Home"

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Figure 3: Smart-Home System Temperature Control Use Case

Use Case ID	UC_2
Use Case Name	Control Temperature
Actor(s)	Members of home
Goal in context	Controlling temperature in room
Pre-conditions	Application is running properly

Post-conditions	User can control temperature of the room
Basic Flow of Actions	1. Heat the room on pressing "Heat" button
	2. Cool the room on pressing "Cool" button
	3. Maintain the temperature as required on pressing "Auto"
	4. Off air conditioning on pressing "All Off"
	5. Display outside temperature and humidity on the panel
	6. Display inside temperature and humidity on the panel
	7. Set the required temperature to heat room up to that temperature
	8. Set required temperature to cool room up to that temperature
	9. Return to Home panel on pressing "Home"

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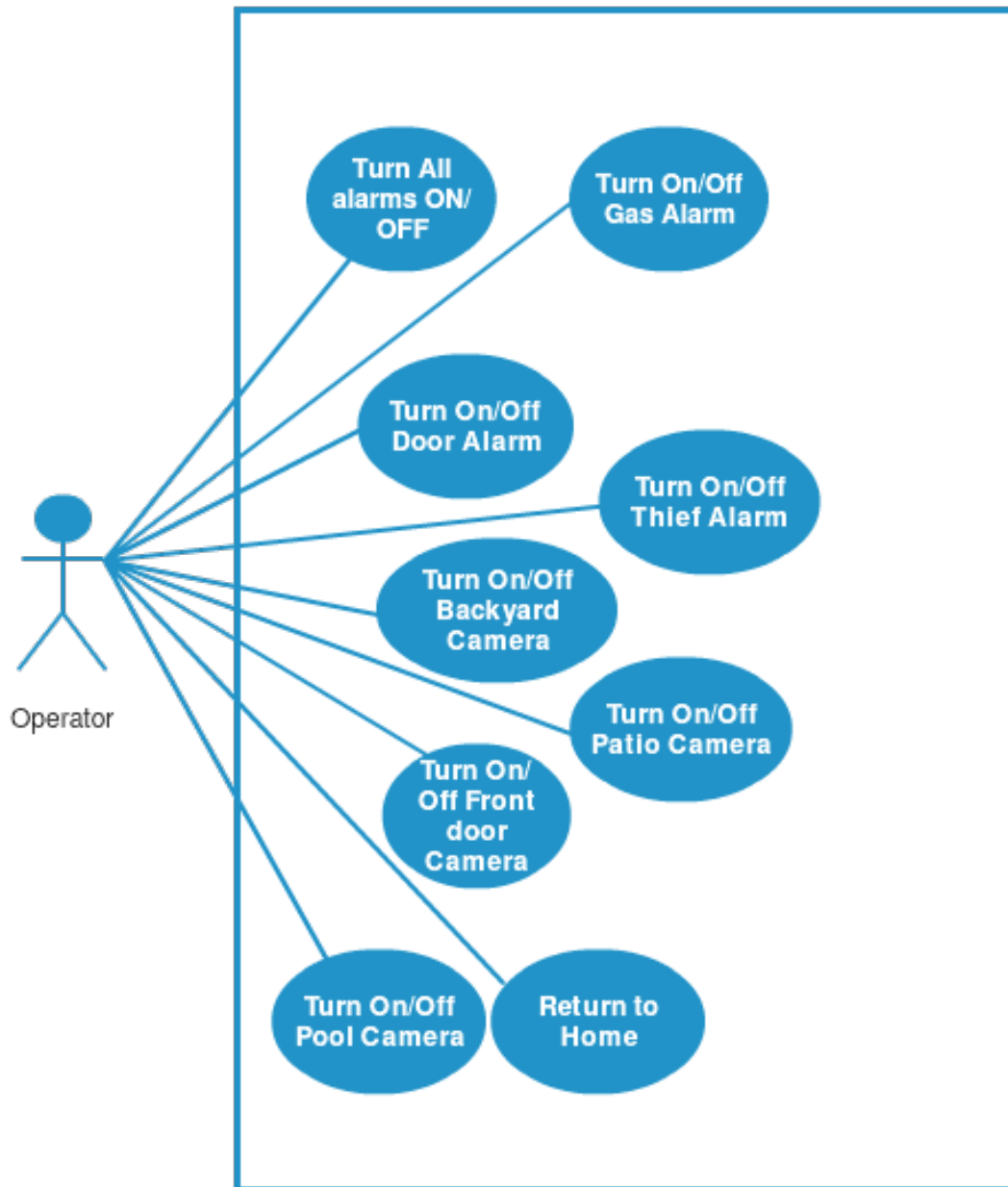
Figure 4: Smart-Home System Security and Monitoring Control Use Case

Use Case ID	UC_3
Use Case Name	Control and Monitor Security
Actor(s)	Members of home
Goal in context	Controlling security and monitoring all activities inside outside of home
Pre-conditions	Application is running properly
Post-conditions	User can control and monitor security of home
Basic Flow of Actions	1. Turn ON/OFF Gas alarm on pressing ON/OFF 2. Turn ON/OFF Door alarm on pressing ON/OFF 3. Turn ON/OFF Thief alarm on pressing ON/OFF 4. Turn ON/OFF Water leak alarm on pressing ON/OFF 5. Turn all alarms ON pressing "All On" 6. Turn all alarms OFF pressing "All Off" 7. Turn ON/OFF Backyard camera on pressing ON/OFF 8. Turn ON/OFF Patio camera on pressing ON/OFF 9. Turn ON/OFF Front Door camera on pressing ON/OFF 10. Turn ON/OFF Pool camera on pressing ON/OFF 11. Turn all camera ON pressing "All On" 12. Turn all camera OFF pressing "All Off" 13. Return to Home panel on pressing "Home"

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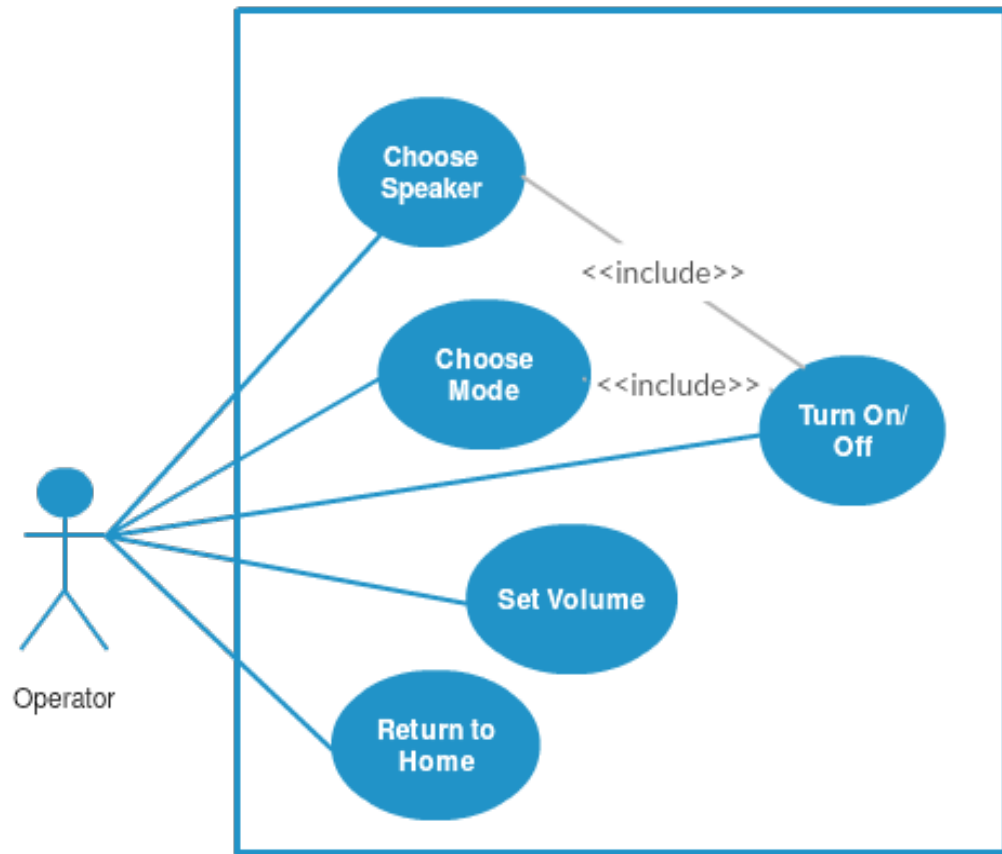
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Smart-Home System Entertainment Control

Figure 5: Smart-Home System Entertainment Control Use Case

Use Case ID	UC_4
Use Case Name	Control Entertainment System
Actor(s)	Members of home
Goal in context	Controlling all entertainment devices present in room

Pre-conditions	Application is running properly
Post-conditions	User can control all entertainment devices
Basic Flow of Actions	1. Choose speaker "In Wall", "Ceiling", "Surround Sound", "Subwoofer" 2. Press ON/OFF to turn on/off selected speaker 3. Select Mode "Listen", "Relax", "Entertain", "Reading" 4. Set Volume by using scrollbar provided 5. Return to Home panel on pressing "Home"

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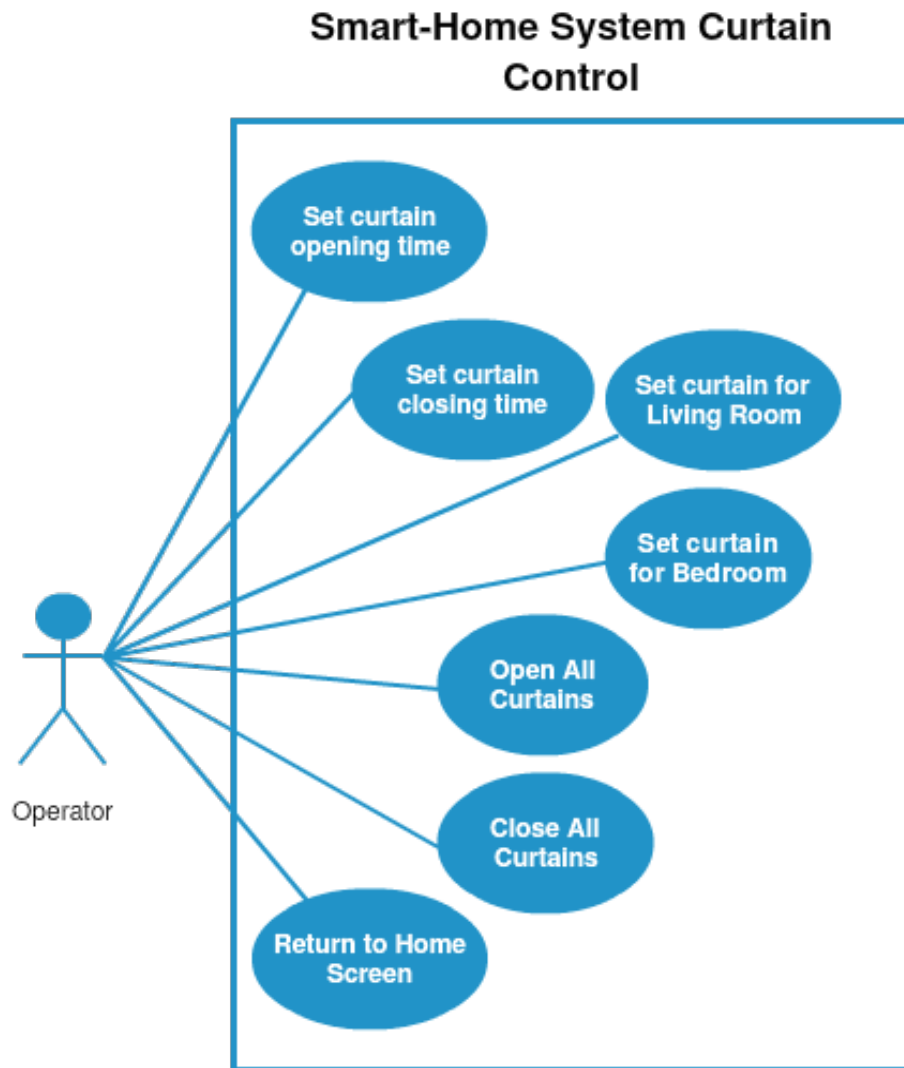
Figure 6: Smart-Home System Curtain Control Use Case

Use Case ID	UC_5
Use Case Name	Control Curtains of windows
Actor(s)	Members of house
Goal in context	Controlling curtains of windows

Pre-conditions	Application is running properly
Post-conditions	User can control curtains of windows
Basic Flow of Actions	1. Close all curtains on pressing "All Closed" 2. Open all curtains on pressing "All Open" 3. Select curtain closing time from dropdown provided next to "Close at" 4. Select curtain opening time from dropdown provided next to "Open at" 5. Control bedroom curtain open/close level by using scrollbar provided next to Bedroom 6. Control bedroom curtain open/close level by using scrollbar provided next to Living room 7. Return to Home panel on pressing "Home"

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Smart-Home System Sprinkler Control
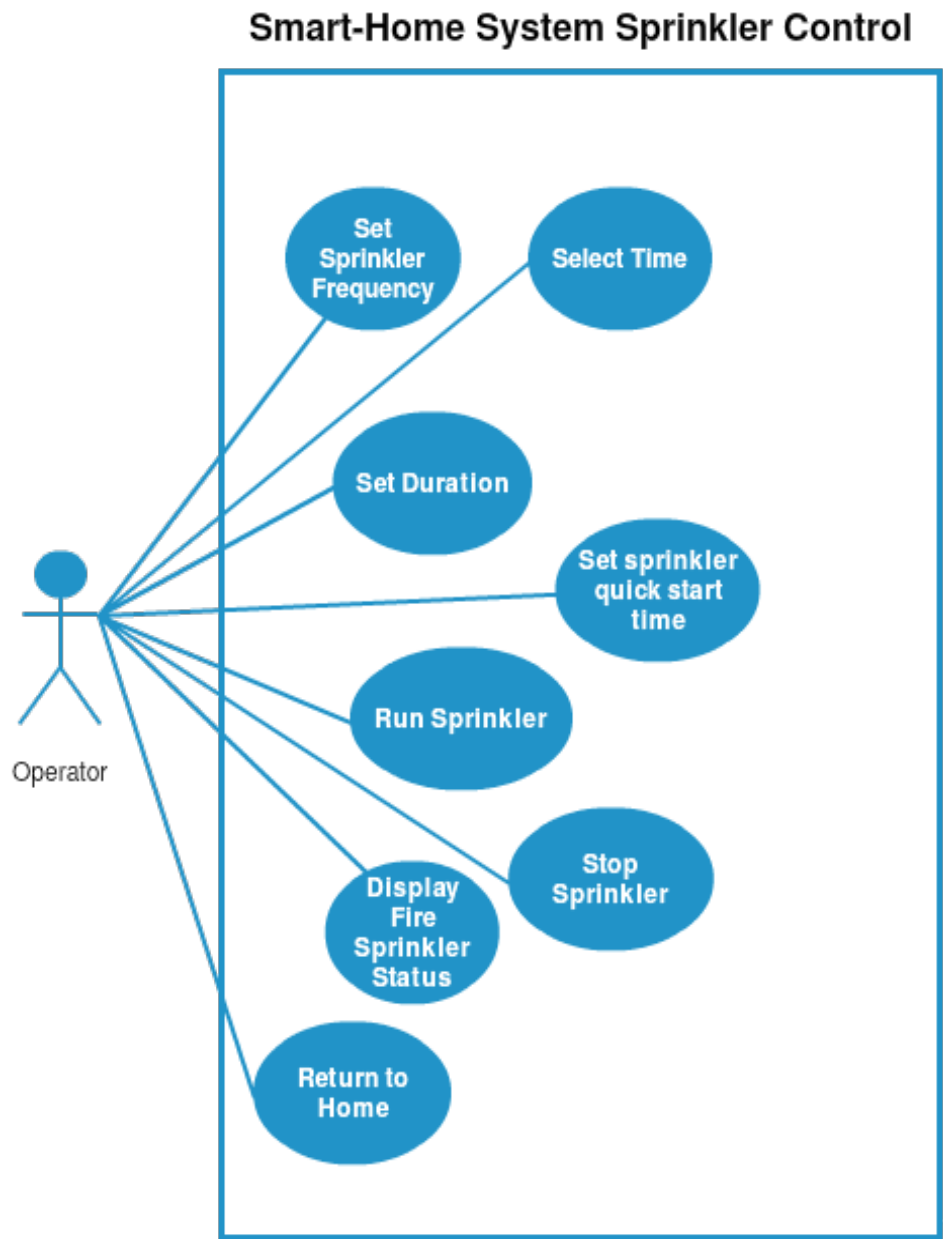
Figure 7: Smart-Home System Sprinkler Control Use Case

Use Case ID	UC_6
Use Case Name	Control Water Sprinkler

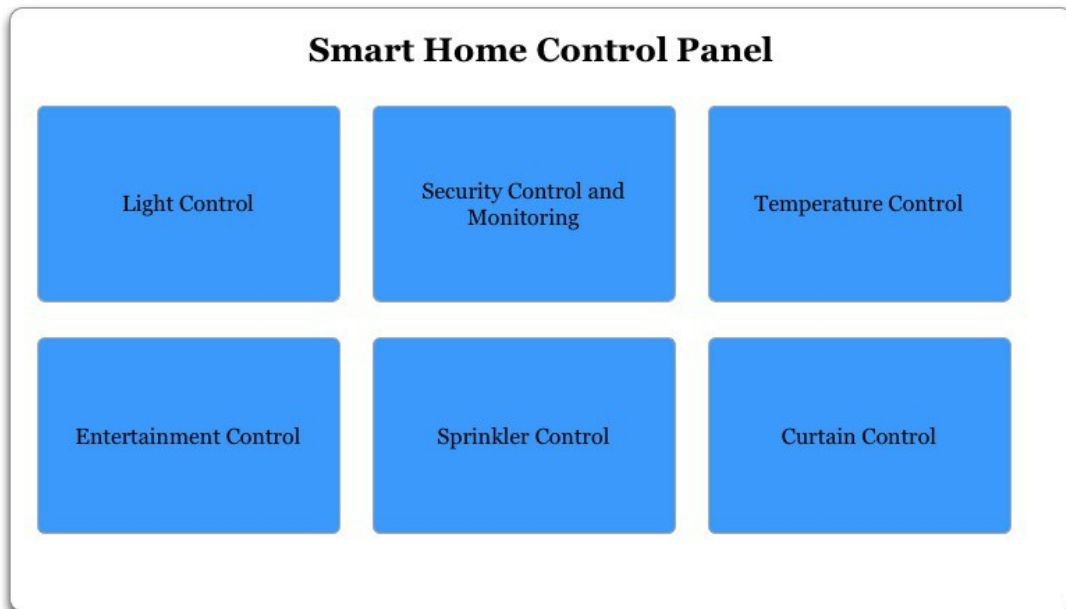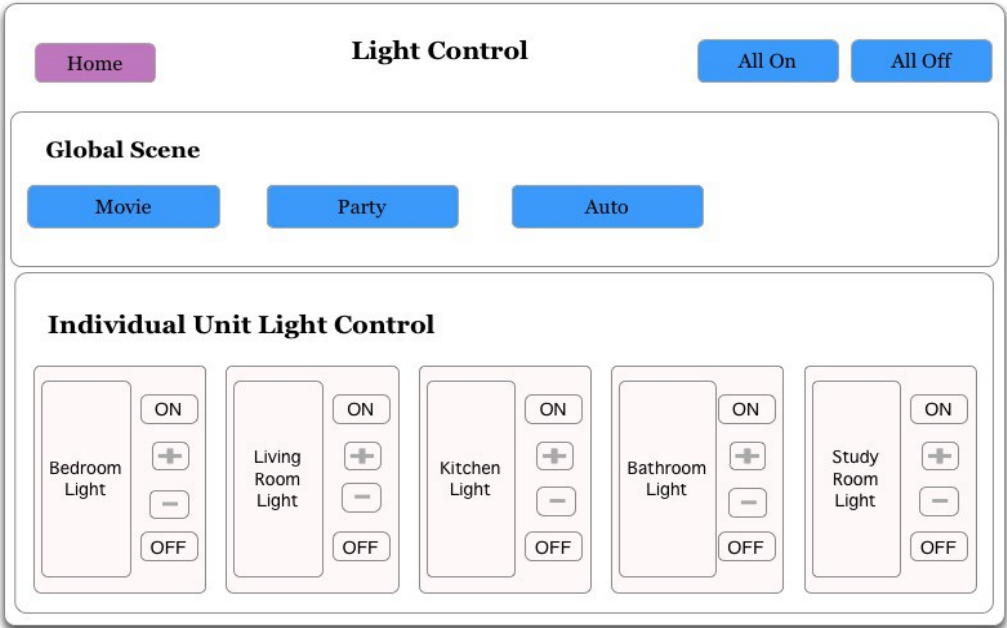| Actor(s)	Members of house
Goal in context	Controlling garden water sprinklers
Pre-conditions	Application is running properly
Post-conditions	User can control sprinkler in garden
Basic Flow of Actions	1. Select frequency of sprinkler "Daily", "Weekly" and "Twice a week" 2. Select the time from dropdown next to "Select Time" at which sprinkler should be started 3. Press run to schedule sprinkler as per selection made in step 1 and 2 4. Select the duration for which Sprinkler should be on 5. Select Quick start time duration to start sprinkler after that time from current time. 6. Press "Stop" to stop sprinkler 7. Display Fire Sprinkler Status 8. Press "Home" to return to Home panel

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PROTOTYPING

By utilizing the outcome of interviews and joint application design, below is the prototype for Smart-Home System we built.

This static prototype shows control panel of each control along with functionality provided with it.

OUTCOME

Light Control Screen

Light Control

Home

All On   All Off

Global Scene

Movie   Party   Auto

Individual Unit Light Control

Bedroom Light	Living Room Light	Kitchen Light	Bathroom Light	Study Room Light
ON	ON	ON	ON	ON
+	+	+	+	+
−	−	−	−	−
OFF	OFF	OFF	OFF	OFF

Temperature Control Screen

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Temperature Control

Home

System
- Heat
- Cool
- Auto
- All Off

Fan
- On
- Off
- Auto

Outside Temperature **73**

21% Humidity

Indoor Temperature **69**

17% Humidity

Set to 69

Security Control and Monitoring Screen

Security Control and Monitoring

Home

Alarm

	ON	OFF
Gas Alarm	ON	OFF
Door Alarm	ON	OFF
Thief Alarm	ON	OFF
Water Leak Alarm	ON	OFF

All On   All Off

Video

	ON	OFF
Back Yard Camera	ON	OFF
Patio Camera	ON	OFF
Front Door Camera	ON	OFF
Pool Camera	ON	OFF

All On   All Off

Entertainment Control Screen
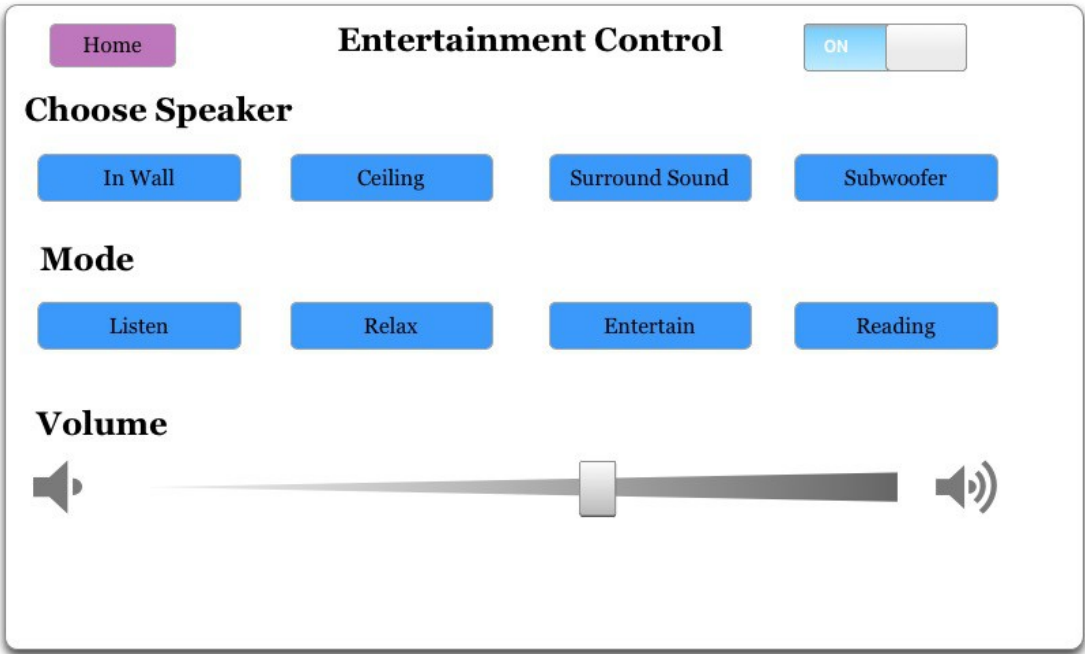
Curtain Control Screen

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Sprinkle Control Screen

PROJECT PLANNING

The following Gantt chart was prepared to keep a track of various tasks associated with the project on Smart Home System. Here's a basic time schedule with dates included:
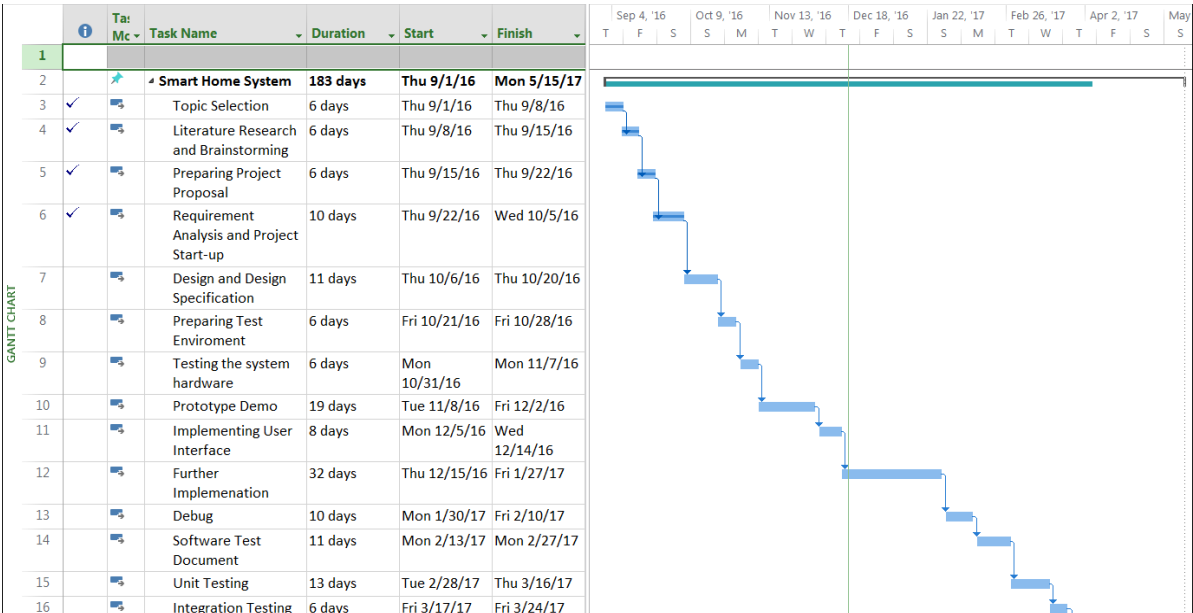

Figure 8: Gantt chart for the Project Schedule

BUDGET AND RESOURCE ESTIMATION

Total estimated budget for this project over 8 months' period is US$17, 12,600.00 including project personnel and other resources identified currently.

Resources	Estimated Performance Period in Months	Estimated Cost
Personnel:		
Project Manager (1, 50% efforts)	8	$120,000.00
Business Analyst (2)	6	$160,000.00

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Functional Analyst (2)	3	$160,000.00
Developers/Programmers, web designer	5	$60,000.00
Database Administrator	5	$50,000.00
System Administrator	4	$55,000.00
Testers (3, offshore)	4	$57,600.00
User training		$20,000.00
Sub Total:		$682600.00
Other Infrastructure, third party tie up and software costs		$10,00,000.00
Representative Travel, phone and other communication costs		$20,000.00
Misc.		$10,000.00
Total		**$17,12,600.00**

PROCESS MODEL

We will be using the Waterfall Lifecycle model for the project. We started with research on the current market and recently developed homes with automation system. This was followed by brainstorming session and discussions on the pros and cons of this. We ended up adding extra design features which will make this project quite interesting.

As per the waterfall model, we proceeded with the Requirements analysis and specifications. This was extremely helpful in writing down the functional and non-functional requirements for this project. This indeed was the very important, since this defines the layout for the overall process for the design of the software project. The requirements do provide a clear layout on the design aspects of the software development. After the design phase, we will continue with the next step i.e. implementation. After the implementation step is near to completed, we will be focused on testing and the maintenance as per the requirements specified in this document
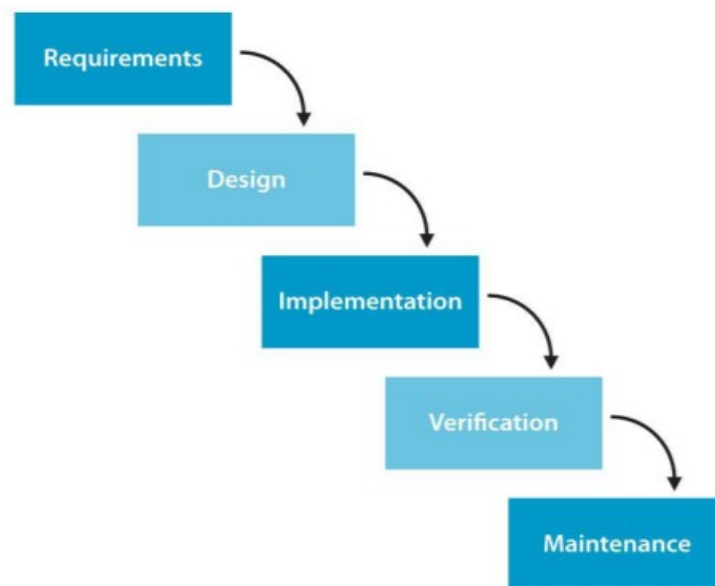

Figure 9: Process Model for Smart-Home System

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