Software Engineering

Assignment 3

Component & User Interface Design

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## Develop a data flow diagram, state chart, activity diagram, and interface description for the in-home smart thermostat system

Diagram

Description automatically generated

Data Flow Diagram for the in-home smart thermostat system

Data flow diagram represents the data flow from start to out of the process. It shows how the information enter and leaves the system or software based on the user choice. It also shows the changes made to the information and where the information is being stored.

Diagram

Description automatically generated

Start Chart Diagram

Start chart diagram represents the behavior of the software system or application. It shows the expression of system condition in the simplest form. The start diagram shows the state of the class and not the processes or commands causing the changes to the system or software. However, it still describes the different states of a component within the software application. The diagram shows the state chart by identifying the different objects, states, and events.

## Design a simple user interface for the thermostat system

Diagram

Description automatically generated

## Write a report that includes the following:

### An explanation of the purpose and use of class-based component design

The thermostat used to control the climate control of the entire house or individual room. The basic function of the smart home thermostat is to set temperatures and control the compressor and evaporator coils of the air conditioning unit hardware by monitoring the current temperature of the house and the climate control the equipment accordingly to maintain the temperature and save the energy to ultimately save energy bill for the home occupant(s).

Developing the application followed the class-based component design because it focused on the decomposition of each individual functional or logical components of the application. The result led to the well-defined individual components and functions with simple and functional interface. It contains methods, properties, and events. Utilizing this design philosophy, we can divide the problem into sub-component problems and give more concentration on each object of components thereby proving the feature of abstraction.

Hence, example here is the one o the component is heating control. For heating control, we can write function for temperature sensor then a power relay controlling. This helps the users to set a correct temperature and heater to activate until it reaches the desired temperature, then shut off the heater.

### A proposed testing plan for your software. Your testing plan should identify possible testing gaps and account for components that can't be tested before launch.

Proposing the testing plan for the software, we can help to make the error free software and ensure the quality of the application. Test plan is a detailed documentation that should cover various tests strategy, objectives, plan, and test environments. This also covers estimation and resources required to execute the testing for this software. We need to analyze the product and features. This requires the tracking of the progress of the testing as part of the validation process. The main goal of the testing is to validate the software meets the required specifications when it was initially brainstormed and designed. The testing process validates the expected response of the inputs to the intended outputs to find any defects and errors (gap of the design and reality).

### A justification of your user interface design and testing plan. Use Study.com lessons and outside sources to find evidence that will support your choices.

User interface design must be as user-friendly as possible. Meaning it should be visually appealing and easier to understand and navigate. I tried to make it as simple and wanted users to control the application between one to two touches with intuitive control with fluid workflow because we want to model to have minimal clicks and stops.

The testing plan should be precise and easy to follow so users and engineers can easily validate the software and application. However, it should as through as possible so that we can test and validate the expected outputs based on the designed input and output combinations.

## References:

Kypridemos, A. (2020). *Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers*. Study.Com. https://study.com/academy/lesson/component-level-design-definition-types.html

Gloag, D. (2020). *Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers*. Study.Com. https://study.com/academy/lesson/class-based-component-design-principles-process.html

Tuning, S. (2020c). *Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers*. Study.Com. https://study.com/academy/lesson/practical-application-for-software-engineering-component-level-design.html

Tuning, S. (2020d). *Study.com | Take Online Courses. Earn College Credit. Research Schools, Degrees & Careers*. Study.Com. https://study.com/academy/lesson/practical-application-for-software-engineering-user-interface-design.html