Siemens – Ultrasound

Duration : 45 minutes

Instructions

1. *Please switch off your mobiles.*
2. *No discussions entertained after question papers are distributed.*
3. *On the answer sheet please write your [1] Name [2] Mobile No [3] Language (Either C# or C++) [4] Experience (No. of years)*
4. *Do not write anything on the question paper. You may collect additional papers for your rough work.*
5. *No negative marks.*
6. *Once you are done please handover the question paper and answer sheet to the invigilator.*
7. *Those who cleared the test will be called for Technical F2F round - > Manger round -> HR Round on the same day*

A tread mill controller controls the hardware (motors and actuators) based on user inputs. Assuming that the hardware controls (speed controls, inclination controls, start, stop, emergency stop, heart rate sensor) and exercise calculations (calories burnt, max heart rate based on user profile..) are provided as APIs, design the controller that supports the following features

1. Configure user profile based on age, sex, height, weight.
2. Support pre-defined exercise programs(cardio, interval, performance)
    a. For example a cardio program will contain speed 5, inclination 2 for 10 seconds + speed 10, inclination 5 for 10 seconds.
3. Support creation of custom programs
4. Support save / retrieve custom programs
5. Design for Safety:
    a. During program, monitor patient heart rate through sensor and stop program gracefully (not an ad-hoc kill) when the heart rate approaches max.
    b. Have an emergency stop * this should be highly performant (highlight the design considerations for this)

Represent the design with **appropriate views** (static & dynamics views) and the above requirements mapped to different elements.

Provide the implementation related aspects as notes.