Assignment KD5065 (C-Programming) 2017/2018

Module Information

Module Title: C-Programming and Digital System
Module Code: KD5065
Module Tutor: Ian Elliot
Assessment set by: Hoa Le Minh
Academic Year: 2017-2018

Dates and Mechanisms for Assessment Submission and Feedback

Date of hand out to students: 22/01/2018
Mechanism to be used to disseminate to students: eLP
Date and Time of Submission by Student: 27/04/2018
Mechanism for Submission of Work by Student: eLP
Date by which Work, Feedback and Marks will be returned to Students: 18/05/2018
Mechanism(s) for return of assignment work, feedback and marks to students: eLP

Assignment Brief

Clear statement of the work that students are expected to undertake:
Please see the instruction below

Further Information

Learning Outcomes assessed in this assessment:
Assessment Criteria/Mark Scheme: See the guidance below
Referencing Style: References are included in IEEE style
Expected size of the submission: The report should not be over 25 pages including all figures and codes
Assignment weighting: This assignment is worth 50% of the module marks

Academic Integrity Statement: You must adhere to the university regulations on academic conduct. Formal inquiry proceedings will be instigated if there is any suspicion of plagiarism or any other form of misconduct in your work. Refer to the University's Assessment Regulations for Northumbria Awards if you are unclear as to the meaning of these terms. The latest copy is available on the University website.

Failure to submit: This coursework is compulsory. The University requires all students to submit assessed coursework by the deadline stated in the assessment brief. Where coursework is submitted without approval after the published hand-in deadline, penalties will be applied as defined in the University Policy on the Late Submission of Work. https://www.northumbria.ac.uk/static/5007/arpdf/lateappr

Anonymous Marking: University policy requires that work be marked anonymously. In order to facilitate this we request that only your student number is included on work submitted for summative assessment. *(statement can be excluded if work is exempt from anonymous marking)*

Assignment task

Design a system that distributes the electrical powers based on input sensor values. The system has three electricity generators including a primary power generator G0 and two auxiliary generators G1 and G2 to provide power for a consumer network (load). Generator G0 is always ON, whereas G1 and G2 are ON only when required. Two sensors, sensor 1 (S1) and sensor 2 (S2), are used to monitor different load points in the consumer network. Each provides 4-bit information representing in percentage of power consumption. The sensor values are used to control the auxiliary power generators, G1 and G2. These generators are only ON when the measured power consumptions are above certain thresholds.

You will design a system using PIC to implement the above operation. Write a C program that allows a PIC to read the values from all sensors and control the generators. Initially G1 and G2 are OFF when the reading power consumptions are low. The generator G1 will be turned ON when the value of measured power consumption from S1 is over 60%. The generator G2 is ON when S2's value is over 70%.

If the measured power consumptions are very high, i.e. the values of S1 and S2 are both over 90%, the generators will likely be overloaded, therefore all generators should be isolated from the network if the sensor values are still over 90% after a period of 10 seconds. The PIC should then switch G0, G1 and G2 OFF to isolate all generators from the network and turn the warning LED light ON.

Marking components

The Assignment Report(*) total mark will be 100%. It will include:

- Determine problem specification (5%)
- Full system block diagram (10%)
    - Input - 5%
    - Output - 5%
- State diagram with comments (25%)
    - State diagram - 20%
    - Comments - 5%
- Codes with comments (30%)
    - PIC configuration – 5%
    - Sensor reading – 5%
    - G1 is ON – 5%
    - G2 is ON – 5%
    - All Gs are OFF – 5%
    - Comments – 5% (1% each section)
- Simulation results with discussion (25%)
    - Screenshots of the achieved results for each case – 15%
    - Analysis and discussion for each case – 10%
- Report presentation (5%)

(*) The assignment is an individual work