

National Institute of Technology Calicut
Department of Computer Science and Engineering

Monsoon Semester – 2020
CS3003D: Operating Systems

Assignment – 2

1. Temperature Controller – Using named and unnamed pipes

Consider three processes P1, P2, and P3 in an IoT architecture. The process P1 reads the temperature setting from the thermostats installed in a factory from five different locations, viz., L1, L2, L3, L4, and L5. The recorded temperature should be in the range 15 deg Celsius to 45 deg Celsius. Process P1 collects and sends the data (user input temperature data) to Process P2. Process P2 calculates the average and the standard deviation of the recorded temperatures and send to Process P3. Process P3 analyses the temperatures with the average (avg) and std. deviation (sd) and performs the following:

- If the location temperature is equal to avg, the location is categorized as Cat0
- If the location temperature is greater than avg+sd, the location is categorized as Cat1
- If the location temperature is greater than avg but less than avg+sd, the location is categorized as Cat2
- If the location temperature is less than avg but greater than avg – sd, the location is categorized as Cat3
- If the location temperature is less than avg – sd, the location is categorized as Cat4

The Process P3 then sends the category of each location to Process P1. The Process P1 then actuates the thermostat temperature as per the rules as follows:

- Cat0: Temperature setting remains the same.
- Cat1: Temperature setting is reduced by 3 deg.
- Cat2: Temperature setting is reduced by 1.5 deg.
- Cat3: Temperature setting is increased by 2 deg.
- Cat4: Temperature setting is increased by 2.5 deg.

The Process P1 then prints the revised temperature at each of the locations.

2. Password Strength Calculator – Using Shared memory

Consider three processes P1, P2, and P3 sharing a memory space. Process P1 receives a character array, password, of length 10 (contains both special character as well as alphanumeric characters) from the user. Process P1 stores the received character array in the shared memory. Process P2 calculates the number of alphanumeric and special characters present. Process P3 then determines the strength of the password by the following:

- If number of alphanumeric characters \geq the number of special characters, the Password is 'Weak'
- If number of alphanumeric characters $<$ the number of special characters, the Password is 'Strong'

Process P3 then communicates to Process P1 the strength of the password as 'Strong' or 'Weak'.

National Institute of Technology Calicut
Department of Computer Science and Engineering

Instructions:

- Submit the programs as a rar file (with FirstName_RollNo.rar)
 - Should be submitted individually
 - Source code and Readme file should also be submitted

Submission Deadline : 31, Oct.'20 (11:59 pm)

Submission Mode : Online (upload to Eduserver Coursepage of CS3003D)
