Script

Hello and welcome to my video presentation for my Course work project Exam number: 113652

The part of Wellbeing I focused on was mental and physical wellbeing for students when studying

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Basic Requirement 1: **Create a Fully Automated Embedded System that utilizes digital/analogue outputs to support the theme of wellbeing**

For my embedded system I decided to make a study tracker. I used the in built micro bit sensors to collect data on sound levels in DB temperature levels in degrees Celsius as well as using the inbuilt gyro meter to determine if the user was drinking water. The system would automatically collect this data upon receiving power. I allowed for the user to press the a button to start tracking the time it had elapsed and then alerted the user once 30 mins had passed. My outputs consists of sending the data out over the serial port. I also used both the in built led screen and the inbuilt speaker to alert the user when 30 minutes had elapsed

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Basic Requirement 2: **Validate and Store the data gathered from the embedded system**

I sent up the mircobit code to send all data received over serial to a PC, I used the code shown in this image to determine what serial port it had connected to and used this piece of code to initially take in the data and place it into a csv file, this code also checks for null values and prevents them from entering the csv. To validate the data I had assigned each data type a letter at the end of each. I then used a function I created to filter the data and place each one into the correct list based on the letter present in the data point. I then ran through each list 2 more times to remove the letter and make the values intergers to preform calculations on it ( show data process function)

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**Basic Requirement 3: Create an analysis component that can be used to calculate and predict certain information and inform future decisions related to wellbeing:**

After making each list integer I created a function to calculate the mean of each list. I then used this mean to inform the end user about their study environment for example if it was too loud or to warm if they needed to drink more water.

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**Advanced Requirements**

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**Advanced Requirement 1: Using Python and/or JavaScript, create a computer model based on your own personally created dataset of wellbeing data or one sourced externally. Your personal dataset could be generated manually, programmatically or by the embedded system. It should contain multiple descriptive features of wellbeing and the model should be capable of answering a minimum of 2 what if questions**

**For the initial use of the model I used a dataset taken from the embedded system as can be seen on the screen. The model I chose to make was one that simulated study scores based on environmental factors and the research as to how they impact effective study. The model itself can be found in the studyscores.py file. It takes in 4 values**

**The model starts by initlise the study score itself starting at 50. I found it starting at 50 had the best results for what I was trying to achieve**

**The model takes in the average of the sound levels and using an if statement if the sound is to loud removes 40 and if it is quite it adds 20**

**It then checks the temperature values and checks if it is within a certain range, if it is 20 is added to the score and if it is not 30 is taken away**

**When time is entered into the model it is as a list, each item in the list is checked is it is over 30 minutes in mircobit time. If it is over 30 minutes and under an hour 5 is added and if not 5 is taken away**

**The model takes in the mean of “water taken in” which is the gryo meter readings and checks it against a figure I determined to be most likely the person having a drink of water. If it is above this average I added 1 to hydration and used that to effect a greater change to the score.**

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**Advanced Requirements 2: Each “what if question” must use a minimum of 3 validated parameters and 2 different datatypes and based on the information provided offer insight into aspects of well being:**

**My first what if question was what if the noise level was 2 high. I created a function to create a dataset that simulates the noise being much higher then in the initial dataset. I then use the previously shown validation and sorting function to validate the data. I get the mean of this data 20 times despite the value being the same, i did this as it allowed for easier graphing of Advanced Requirements 3, I then fed this dataset into the model 20 times again to create a list of values for easier graphing. I used floats for the average of both sound and temperature and i used int for the mean of the water taken in as i felt it made it more accurate**

**I then printed to the screen the study score found and a comment on how the noise levels effected it**

**My second what if question was if the temperature was at heat wave levels like the previous one I created a function to generate a dataset and used the sorting function to sperate the values into list, my two datatypes were again float and int and I ran the mean for the temp 20 times as well as the studyscore. This allowed for easier graphing. I then printed a comment about the high temptures and the effect it had on the** **studyscore.**

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**Advanced Requirements 3: User can view data in a graphical format**

Through my course work I became aware of the matplotlib library for python this allowed me to create graphs from lists that I had within the code itself. I wanted to compare the base study score with my what if questions the same figure, I had to preform additional research to do this and I discovered this code and how to use it. On the left hand side of the figure are the two control graphs that show the dataset that i myself collected. The 2 graphs on the right show the graphing of the datasets I generated. The x axis is not used for these graphs and is instead used to just place the graphs next to each other. I felt bar charts best represented my data in an easy to compare way.

Thank you for listening