QQI

MSc AI

SUMMER 2021 EXAMINATIONS

Module Code: **B9AI108**

Module Description: **Programming For Data Analysis**

Examiner: **Paul Laird**

Internal Moderator: **Abhishek Kaushik**

External Examiner: **Andrew Parnell**

Date: 7th May 2021
Time: 09:30-12:30

INSTRUCTIONS TO CANDIDATES

Time allowed is 3 hours
Answer All Questions

Please run python program in any IDE (Google Colab, Visual Code, Pycharm, Spider, Jupyter notebook and etc.). You MUST submit the .py or .ipynb source file. Please also screen shot the program and its output and paste in the Answer Sheet.

Question 1

Data are provided on moodle in the files hours.csv, which is in comma-separated format, and employees.json, which is in JSON format. Provide code snippets for the following:

Read in both files into data frames, and merge on the EID column

(9 marks)

Create additional columns as follows:

a. RHW: the minimum of HW and RH
b. OTW: HW - RH unless this is negative, in which case it is zero
c. OTR: HR multiplied by OTM
d. RP: RH multiplied by HR
e. OP: OTW multiplied by OTR
f. GP: RP plus OP
g. SRP: 700, unless GP is less than this, in which case it is GP
h. HRP: GP minus 700 unless negative, in which case it is zero
i. SRT: SRP multiplied by 0.2
j. HRT: HRP multiplied by 0.4
k. TT: SRT plus HRT
l. TD: TT minus TC unless negative, in which case it is zero
m. NP: GP minus TD

(13 Marks)

For each distinct value of DATE, provide the total of GP for the relevant rows of the data frame.

For each distinct value of EID, provide the average of NP for the relevant rows of the data frame.

Plot the values of NP against GP

(3*6=18 Marks)

(Total: 40 Marks)

Question 2

Create a class Permutation which, given a six-digit number in its contsructor, stores a permutation of its digits in an instance variable __target, and provides a method guess(num) which returns the number of digits which are not the same in num and __target.

(10 Marks)

Create a function solve(Permutation, original_number) which if given the instance and the original six-digit number, will output the correct permutation.

(10 Marks)

(Total: 20 Marks)

Question 3

Write a program in python to implement a takeaway ordering system using OOP concepts where customers can select a main course and starter and one or more sides from the menu. Create a separate order and dish class. Your program must be menu driven. The user should identify themselves at the main menu and return to the main menu when finished. You are free to choose methods and attributes of your choice to implement this functionality.

(35 Marks)

Big Data sometimes necessitates alternative approaches to problem solving and algorithms, due to the large processing requirements or short timeframe. Why are functional programming approaches frequently used in modern distributed data-processing solutions?

(5 Marks)

(Total: 40 Marks)

END OF EXAMINATION