UNIVERSITI TEKNOLOGI PETRONAS

EXTENDED ASSIGNMENT
MAY 2020 SEMESTER

COURSE : TDB1023 / TEB1113 – Algorithm and Data Structure

DATE : 04-09-2020

TIME : 9:00 AM – 8:59 AM (24 Hours)

INSTRUCTIONS TO CANDIDATES

1. The Extended Assignment (EA) is an open-book assessment. Students can refer to online resources, learning materials, textbooks, and other reading materials to answer the questions posted in the assessment.
2. Answer **ALL** questions.
3. The duration to complete the EA is **TWENTY-FOUR (24) HOURS**.
4. Students are allowed **ONE (1)** attempt to do the EA successfully where only **ONE (1)** duly completed EA submission is permitted. Multiple submissions are **NOT** allowed.
5. **MAXIMUM** file size for your EA submission to be uploaded to ULearn is **20MB**.
6. Please **upload** your answers in **ONE (1) PDF file**.
7. Please make sure your answer in the PDF file is **clear and readable** and name your file as follows: **"your name_your ID_EA Answer"**
8. Late submission and unclear/unreadable answer will not be accepted.

NOTE: You are required to submit "**CERTIFICATION OF ORIGINALITY**" in the first page of your answer sheet.

1. Assume that you have recently joined a business start-up as a software developer. The very first task assigned to you is to assist the human resource department in their automation process. The HR manager is interested in building a custom program to manage employee records. A sample of an employee record is shown in **Table Q1**.

Table Q1: Sample of an Employee Record with Fields

Employee ID	21-2020
Name	David Gilmour
Date of Birth	22-02-1989
Designation	Area Sale Manager
Pay Grade	5
Contact Number	011 58961452
Address	House #99, Jalan 99, LakeVille, Seri Iskandar, Perak

The HR manager is interested in having following text driven menu options.

1. Add a new employee record
2. Search and display existing employee record
3. Edit an existing employee record
4. Delete an existing employee record
5. Print all employee records
6. Quit program.

In addition to this, as per policy,

i. Employee ID follow *XX-YEAR* format where *XX* is next number in a sequence starting from 01.
ii. None of the data fields in any employee record can be blank.
iii. Search can only be done using employee ID.
iv. A delete record operation requires double confirmation from user.

Your task is to;

a. Propose with justification a suitable data structure to develop this program.

[25 marks]

b. Build the design of the class (only variable descriptions and method signatures are needed) using Object Oriented Design concepts.

[25 marks]

2. Imagine a hospital scenario where patients are segregated based on Adult (Male, Female) and Minor (Male, Female) categories. The patients can come at different times of the day and can belong to any of the categories. Currently, only one doctor is available to examine the patients. The doctor prefers to see patients in their arrival sequence and in the following order till no more patient is in the waiting hall.

Minor (Female), Minor (Male), Adult (Female), Adult (Male)

Your task is to;

a. Propose an appropriate data structure needed to simulate the above mentioned scenario.

[25 marks]

b. Develop the hospital simulation using Java. The simulation must perform the following.

i. At any given time show the total number of patients in the waiting hall.

[5 marks]

ii. At any given time show the number of patients for all four categories (individually).

[5 marks]

iii. Show current patient category being examined by the doctor.

[5 marks]

iv. Show next patient category to be examined by the doctor.

[5 marks]

v. Implement proper checks, for example, if no patient is in the doctor's room then pressing "D" should generate an error message.

[5 marks]

- END OF PAPER -