QUESTION 2 – PROBLEM SOLVING **(60 Marks)**

Write three complete Java programs, **`StudentResults.java`**, **`Course.java`** and **`Student.java`** to generate Examination Result Slip based on the instruction given in (a), (b) and (c).

a) Write a class **`Student`** with the following information: (8.5 Marks)

(i) Private member attributes: **name**, **matricsNo**, and **GPA** (Grade Point Average).

(ii) Static instance variable: **totalCredit** (total credit earned).

(iii) A default constructor that initializes static **totalCredit** variable to **0** (zero).

(iv) An appropriate getter (accessor)/ setter (mutator) methods.

b) Write a class **`Course`** with the following information: (15.5 Marks)

(i) The class uses **enum** data type.

(ii) The class has a fixed set of constants as listed in Table 1.

Table 1: Set of constant for **`Course`** class

Code	Description	Credit
SCSJ2154	Object Oriented Programming	4
SCSD2623	Database Programming	3
SCSV1223	Web Programming	3
SCSJ2203	Software Engineering	3
SCSR2043	Operating Systems	3
ULAB2122	Advanced Academic English Skills	2
UCSD2762	Fundamentals of Technopreneurship	2
SCSD3761	Technopreneurship Seminar	1

(iii) Private member attributes: **credit**, **description**, and **grade**.

(iv) A constructor that initializes **credit** and **description** instance variables through parameter passing.

Table 2: Grade points

Grade	Grade Point
A	4.0
B	3.0
C	2.0
D	1.0
E	0.0

(v) An appropriate getter (accessor)/ setter (mutator) methods.

(vi) A method named **getGradeValue** that return a value (grade point) of grade. Table 2 shows the grade point for each grade.

c) Write a class **`StudentResults`** that only has **`main()`** method with the following codes: (36 Marks)

(i) Read a matrics number. The input entered by the user (input data from keyboard), i.e. ***A17CS0010***.

(ii) By using matrics number in c(i), read an input file named ***`matricsNumber.txt`*** (i.e. ***A17CS0010.txt***) that consist of student's name and a list of grade and course code. Three input files are provided named **`A17CS0001.txt`**, **`A17CS0010.txt`**, and **`A17CS0100.txt`** to help you to test/ execute your program. Figure 1 shows the example of two input files (for two different matrics numbers).

```
Amir Hafsyam bin Abdullah
A SCSJ2203
B SCSJ2154
A ULAB2122
B SCSR2043
A SCSV1223
```

(a) A17CS0010.txt

```
Abdullah Abu bin Hanifah
A SCSJ2154
B SCSJ2203
A ULAB2122
C SCSR2043
A SCSV1223
B UCSD2762
```

(b) A17CS0100.txt

Figure 1: Example of input files

(iii) Create an object from class **`Student`** to store the value that you read in c(i) and c(ii).

(iv) Create an object from class **`Course`** to retrieve a description and credit for course based on course's code.

(v) Calculate the total credit earned based on credit that you retrieve in c(iv).

(vi) Calculate the Grade Point Average (GPA). The GPA is calculated by dividing the total amount of grade points earned by the total amount of credit earned.

(vii) Display the Examination Result Slip for the student in the output file named **`Slip`*`matricsNumber`*`.txt`** (i.e. ***SlipA17CS0010.txt***). The program should produce the output as shown in Figure 2.

(viii) Figure 3 shows an example run of program. Note that, **bold** texts indicate keyboard input entered by the user.

```
EXAMINATION RESULTS FOR SEM 2, 2018/2019

NAME       : AMIR HAFSYAM BIN ABDULLAH
MATRICS NO : A17CS0010

CODE        COURSE                                CREDIT    GRADE
============================================================
SCSJ2203    Software Engineering                    3         A
SCSJ2154    Object Oriented Programming             4         B
ULAB2122    Advanced Academic English Skills        2         A
SCSR2043    Operating Systems                       3         B
SCSV1223    Web Programming                         3         A
============================================================

CREDIT EARNED : 15
GPA           : 3.53
```

(a) SlipA17CS0010.txt

```
EXAMINATION RESULTS FOR SEM 2, 2018/2019

NAME       : ABDULLAH ABU BIN HANIFAH
MATRICS NO : A17CS0100

CODE        COURSE                                CREDIT    GRADE
============================================================
SCSJ2154    Object Oriented Programming             4         A
SCSJ2203    Software Engineering                    3         B
ULAB2122    Advanced Academic English Skills        2         A
SCSR2043    Operating Systems                       3         C
SCSV1223    Web Programming                         3         A
UCSD2762    Fundamentals of Technopreneurship       2         B
============================================================

CREDIT EARNED : 17
GPA           : 3.35
```

(b) SlipA17CS0100.txt

Figure 2: Example of output files

```
EXAMINATION RESULT SLIP SYSTEM

Enter student's matrics number: A17CS0010
Examination Slip is generated...

Press any key to continue . . .
```

Figure 3: Example run of program