©May not be copied or duplicated
without the permission of the owner

Concordia University
COMP 248 – Winter 2023
Assignment 3

Due Date:	By 11:59pm March 17th , 2023
Evaluation:	5% of final mark (see marking rubric at the end of handout)
Late Submission:	none accepted.
Purpose:	The purpose of this assignment is to have you manipulate loops and one/two -dimensional arrays of strings
CEAB/CIPS Attributes:	Design/Problem analysis/Communication Skills

NOTE 1: *You are NOT allowed to post any assignment and/or its solution anywhere on the World Wide Web (WWW) and/or the Internet. Intellectual Property Rights are reserved. If any case is discovered via your account or IP address; your submission will NOT be considered and will be reported immediately to the appropriate authority.*

NOTE 2:

i. Do not use/import any other library/package other than *java.util.Scanner*
ii. Neither implement nor use any custom/user-defined method(s)/function(s) for any task herein.
iii. Question 1 requires the use of loops, whereas question 2 involves arrays.

General Guidelines When Writing Programs:

- Include the following comments at the top of your source codes.

```
// -----------------------------------------------------------------------
// Assignment (include number)
// Written by: (include your name and student ID)
// For COMP 248 Section (your section) – Winter 2023
// -----------------------------------------------------------------------
```

- In a comment, give a general explanation of what your program does. As the programming questions get more complex, the explanations will get lengthier.
- Include comments in your program describing the main steps in your program. Focus on your comments should be on the "why" than the "how".
- Display a welcome message.
- Display clear prompts for users when you are expecting the user to enter data from the keyboard.
- All output should be displayed with clear messages and in an easy-to-read format.
- End your program with a closing message so that the user knows that the program has terminated.

Question #1: Simple Brilliant Mind Game Jackpot Program (7pts) Nested Loops

Concordia Office of Community Engagement, this time will lunch a game called "Brilliant Mind" in which any age appropriate student can participate as a contestant for the game. The "Brilliant Mind" game is a one player game that tests general knowledge with questions (the questions number and duration is not subject of this program) from ten consecutive categories topics (see Table- 1) in which each category has a fixed score value associated with it, (e.g. Sports: 19, Music: 18, etc.).

©May not be copied or duplicated
without the permission of the owner

Each completed category's questions will generate all the numbers of the category's score value that are NOT multiple of the category number. For example, the numbers that are generated after completing the category Literature, which has a score value of 18, (i.e. its numbers are from 1 to 18) that are not multiple to 2, since Literature is number 2 in the game category list, are: 1, 3, 5, 7, 9, 11, 13, 15, 17.
The contestant is awarded Cryptom money, calculated based on the sum of the numbers displayed from each category. This sum will be cumulative from one category to the next.

You have been selected to be part of this project in the capacity of a research Intern. In this regard, your primary task involves applying the use of nested loop to develop an algorithm and Java class/program to accomplish the following:

#	Category	Score Value
1	Science	19
2	Literature	18
3	Sports	19
4	Animals	20
5	Television	19
6	Music	18
7	Business	19
8	Geography	19
9	Cities	18
10	Opera	19

Table1: Game categories' number and score

1. Write an algorithm for the *Simple Brilliant Mind Game Jackpot Program*, in a text file named AlgA3_Q1.txt.
2. Name of the class/program: A3_Q1.
3. Display a welcome/salutation message to the user of the program.
4. Display a prompt message for the user to enter a valid age, that should be higher than 15 and less than 125 years.
5. Process for each category the numbers in its score value that are NOT multiple of that category number.
6. Process the cumulative Cryptom money at the end of each category as a sum of the numbers computed in (5) above.
7. Display for each category the numbers that are not the multiple of the current category number, in the form of ten numbers per line, followed by the cumulated reward Cryptom money.
8. Finally, display a complimentary-close message as follows:
   Thank you for using my bespoke the Simple brilliant Mind Game Jackpot Program!

The following are samples of screenshots to illustrate the expected behavior of your program. Your program must display the same information with the same format and should work for any valid user entered data.

©May not be copied or duplicated
without the permission of the owner

```
----****-------****-------****-------****-------****---
   Welcome to the Simple Brilliant Mind Game Jackpot!
----****-------****-------****-------****-------****---

How old are you?
14
Error: Your input/entry is not a valid integer between 15 to 125. Kindly retry again!
How old are you?
18

----****-------****-------****-------****-------****----
      Your Jackpot for the Simple Brilliant Mind Game is:
----****-------****-------****-------****-------****----



In the score of Science, the numbers that are not multiple of category 1 are:
No numbers are found in this category!==> The Cryptom value 0.

In the score of Literature, the numbers that are not multiple of category 2 are:
1, 3, 5, 7, 9, 11, 13, 15, 17, ==> The Cryptom value 81.

In the score of Sports, the numbers that are not multiple of category 3 are:
1, 2, 4, 5, 7, 8, 10, 11, 13, 14,
16, 17, 19, ==> The Cryptom value 208.

In the score of Animals, the numbers that are not multiple of category 4 are:
1, 2, 3, 5, 6, 7, 9, 10, 11, 13,
14, 15, 17, 18, 19, ==> The Cryptom value 358.

In the score of Television, the numbers that are not multiple of category 5 are:
1, 2, 3, 4, 6, 7, 8, 9, 11, 12,
13, 14, 16, 17, 18, 19, ==> The Cryptom value 518.

In the score of Music, the numbers that are not multiple of category 6 are:
1, 2, 3, 4, 5, 7, 8, 9, 10, 11,
13, 14, 15, 16, 17, ==> The Cryptom value 653.

In the score of Business, the numbers that are not multiple of category 7 are:
1, 2, 3, 4, 5, 6, 8, 9, 10, 11,
12, 13, 15, 16, 17, 18, 19, ==> The Cryptom value 822.

In the score of Geography, the numbers that are not multiple of category 8 are:
1, 2, 3, 4, 5, 6, 7, 9, 10, 11,
12, 13, 14, 15, 17, 18, 19, ==> The Cryptom value 988.

In the score of Cities, the numbers that are not multiple of category 9 are:
1, 2, 3, 4, 5, 6, 7, 8, 10, 11,
12, 13, 14, 15, 16, 17, ==> The Cryptom value 1132.

In the score of Opera, the numbers that are not multiple of category 10 are:
1, 2, 3, 4, 5, 6, 7, 8, 9, 11,
12, 13, 14, 15, 16, 17, 18, 19, ==> The Cryptom value 1312.

Thank you for using my bespoke the Simple Brilliant Mind Game Jackpot Program!
```

Figure 1: Sample1 output of Question1.

©May not be copied or duplicated
without the permission of the owner

```
----****-------****-------****-------****-------****---
   Welcome to the Simple Brilliant Mind Game Jackpot!
----****-------****-------****-------****-------****---

How old are you?
75

----****-------****-------****-------****-------****----
      Your Jackpot for the Simple Brilliant Mind Game is:
----****-------****-------****-------****-------****----



In the score of Science, the numbers that are not multiple of category 1 are:
No numbers are found in this category!==> The Cryptom value 0.

In the score of Literature, the numbers that are not multiple of category 2 are:
1, 3, 5, 7, 9, 11, 13, 15, 17, ==> The Cryptom value 81.

In the score of Sports, the numbers that are not multiple of category 3 are:
1, 2, 4, 5, 7, 8, 10, 11, 13, 14,
16, 17, 19, ==> The Cryptom value 208.

In the score of Animals, the numbers that are not multiple of category 4 are:
1, 2, 3, 5, 6, 7, 9, 10, 11, 13,
14, 15, 17, 18, 19, ==> The Cryptom value 358.

In the score of Television, the numbers that are not multiple of category 5 are:
1, 2, 3, 4, 6, 7, 8, 9, 11, 12,
13, 14, 16, 17, 18, 19, ==> The Cryptom value 518.

In the score of Music, the numbers that are not multiple of category 6 are:
1, 2, 3, 4, 5, 7, 8, 9, 10, 11,
13, 14, 15, 16, 17, ==> The Cryptom value 653.

In the score of Business, the numbers that are not multiple of category 7 are:
1, 2, 3, 4, 5, 6, 8, 9, 10, 11,
12, 13, 15, 16, 17, 18, 19, ==> The Cryptom value 822.

In the score of Geography, the numbers that are not multiple of category 8 are:
1, 2, 3, 4, 5, 6, 7, 9, 10, 11,
12, 13, 14, 15, 17, 18, 19, ==> The Cryptom value 988.

In the score of Cities, the numbers that are not multiple of category 9 are:
1, 2, 3, 4, 5, 6, 7, 8, 10, 11,
12, 13, 14, 15, 16, 17, ==> The Cryptom value 1132.

In the score of Opera, the numbers that are not multiple of category 10 are:
1, 2, 3, 4, 5, 6, 7, 8, 9, 11,
12, 13, 14, 15, 16, 17, 18, 19, ==> The Cryptom value 1312.

Thank you for using my bespoke the Simple Brilliant Mind Game Jackpot Program!
```

Figure2: Sample2 output of Question1.

©May not be copied or duplicated
without the permission of the owner

Questions #2: Simple Exam Registration Program (8pts) Arrays

Concordia University has created structures and supports where every aspect of the university is accessible to all students. The Access Center for Students with Disabilities (ACSD) engages in community-building and promote an inclusive environment where an ACSD registered student closely mirrors the academic experience of a non-ACSD registered student of the university. You have been selected to be part of this project in the capacity of a research Intern to develop (using Java Programming Language) program called Concordia ACSD Exam Registration Program (CAERP) which will provide a menu window to the ACSD personal as follow:

```
1.    List of courses
2.    Add a student
3.    Add course(s)
4.    Display details
0.    Exit CAERP
```

Every course is labeled as <course name_section>-<course number>
Therefore, the CAERP prompts the personal to enter a list of courses as a string/text input, into the program with respect to the following format:
<course name1_section1>-<course numbe1>;<course name2_section2>-<course number2>;.... In other words, the input string/text consists of several courses separated by a semicolon;
For each course, the course name contains the section as last character(e.g. `COMP_F`, F is section) which is separated from the course number by a hyphen (-), and where course name is unique.

In this regard, your primary task involves writing an algorithm and Java class/program to accomplish the following:

1. Write an algorithm for the *Concordia CAERP Exam Registration Program*, in a text file named AlgA3_Q2.txt.
2. Name of the class/program: A3_Q2.
3. Display a welcome/salutation message to the user of the program.
4. Display a prompt message for the user to enter all the courses; then, display a prompt message to the user for a menu choice.
5. If the input choice is 1; kindly display a complete list of all courses registered with the centre based on the display representations depicted in Figures 4 and 10.
6. If the input choice is 2; kindly prompt the personal to enter the course name of the course they wishes to add student to, as depicted in Figure 5.
7. If the input choice is 3; prompt the ACSD personal to enter a string/text input containing a list of all the new courses that should be appended to the already existing list of courses registered with the centre, see Figure 6.
8. If the input choice is 4; please display a complete and an ordered list of courses sorted in decreasing number of registered students, such that if two or more courses have same number of registered students then these courses should get same rank, as portrayed in Figure 8.

9. Validate every input from the ACSD personal to ensure that ONLY a valid input for menu choice is entered into the CAERP. If different, display a warning message (as depicted in Figure 10) which will always re-prompt the user to re-enter a valid input menu choice.
10. Finally, if the input menu choice is 0; kindly terminate the execution of CAERP with a compliment-close message as follows (see Figure 9):

    `Thank you for using Concordia CAERP Exam Registration Program!`

The following are sample screenshots to illustrate the expected behavior of your program. Your program must display the same information using the same format, as depicted below.

```
========****======****======****======****======****=========
Welcome to Concordia ACSD Exam Registration Program (CAERP):
========****======****======****======****======****=========

Please enter a list of courses having ACSD students:
comp_u-248;Soen_G-348;MATH_w-332;sTat_h-228
================================
| Choice. Description          |
================================
|  1.     List of courses      |
|  2.     Add a student        |
|  3.     Add course(s)        |
|  4.     Display details      |
|  0.     Exit CAERP           |
================================

Please enter you choice (1, 2, 3, 4 or 0):
```

Figure3: Sample1 output of Question2

©May not be copied or duplicated
without the permission of the owner

```
========**********==========**********==========**********==========**********==========
Welcome to Concordia ACSD Exam Registration Program (CAERP):
========**********==========**********==========**********==========**********==========

Please enter a list of courses having ACSD students:
comp_u-248;Soen_G-348;MATH_w-332;sTat_h-228
================================
| Choice. Description          |
================================
|   1.      List of courses    |
|   2.      Add a student      |
|   3.      Add course(s)      |
|   4.      Display details    |
|   0.      Exit CAERP         |
================================

Please enter you choice (1, 2, 3, 4 or 0): 1
==============================
| Course Name-Course Number  |
==============================
|   COMP_U          248      |
|   SOEN_G          348      |
|   MATH_W          332      |
|   STAT_H          228      |
==============================

Kindly keep entering a valid choice from the menu:
```

Figure4: Sample2 output of Question2

```
Kindly keep entering a valid choice from the menu: 2

Please enter the course name you want to add student to: comp-u
Course name : COMP-U is inexistent in the list of courses.

Kindly keep entering a valid choice from the menu: 2

Please enter the course name you want to add student to: comp_u
A student has been successfully added to the course: COMP_U-248

Kindly keep entering a valid choice from the menu:
```

Figure5: Sample3 output of Question2

```
Kindly keep entering a valid choice from the menu: 3

Please enter a NEW list of courses to add to the ACSD:
enel_s-335;SOEN_f-287;comp_t-248;COMp_w-248
Successfully added a NEW set of courses to Concordia ACSD Exam Registration (CAERP).

Kindly keep entering a valid choice from the menu: 1
```

Figure6: Sample4 output of Question2

©May not be copied or duplicated
without the permission of the owner

```
Kindly keep entering a valid choice from the menu: 1
============================
| Course Name-Course Number |
============================
|  COMP_U         248       |
|  SOEN_G         348       |
|  MATH_W         332       |
|  STAT_H         228       |
|  ENEL_S         335       |
|  SOEN_F         287       |
|  COMP_T         248       |
|  COMP_W         248       |
============================

Kindly keep entering a valid choice from the menu:
```

Figure7: Sample5 output of Question2

```
Kindly keep entering a valid choice from the menu: 4
============================================
| Rank | #students | Course Name - Number|
============================================
|    1 |         4 |  COMP_W - 248        |
|    2 |         3 |  STAT_H - 228        |
|    3 |         2 |  MATH_W - 332        |
|    3 |         2 |  COMP_T - 248        |
|    4 |         1 |  COMP_U - 248        |
|    5 |         0 |  SOEN_G - 348        |
|    5 |         0 |  ENEL_S - 335        |
|    5 |         0 |  SOEN_F - 287        |
============================================

Kindly keep entering a valid choice from the menu:
```

Figure8: Sample6 output of Question2

```
Kindly keep entering a valid choice from the menu: 0

Thank you for using Concordia CAERP Exam Registration Program!
```

Figure9: Sample7 output of Question2

```
Please enter you choice (1, 2, 3, 4 or 0): 5

Kindly keep entering a valid choice from the menu: data

Kindly keep entering a valid choice from the menu: 1
============================
| Course Name-Course Number |
============================
|   COMP_U          248     |
|   SOEN_G          348     |
|   MATH_W          332     |
|   STAT_H          228     |
============================

Kindly keep entering a valid choice from the menu:
```

Figure10: Sample8 output of Question2.

©May not be copied or duplicated
without the permission of the owner

Submitting Assignment 3

- Zip the source code: the java files: A3_Q1.java and A3_Q2.java, and the two text files: AlgA3_Q1.txt. and AlgA3_Q2.txt of the algorithms of this assignment.
- Naming convention for zip file: Create one zip file, containing the files mentioned above for your assignment using the following naming convention:
  - The zip file should be called *a#_studentID*, where # is the number of the assignment and *studentID* is your student ID number.
    For example, for the 3rd assignment, student 123456 would submit a zip file named a3_123456.zip.
- Submit your zip file on e-Concordia or Moodle course webpage.

Evaluation Criteria for Assignment 3 (20 points)

Source Code		
Comments for the two questions (2 pts.)		
Description of the program (authors, date, purpose)	1	pt.
Description of variables and constants	1	pt.
Programming Style for the two questions (3 pts.)		
Use of significant names for identifiers	1	pt.
Indentation and readability	1	pt.
Welcome Banner/Closing message	1	pt.
Question 1 (7 pts.)		
Algorithm 1 description	1	pt.
Prompt for the age info and valid the input	1	pt.
Display each category value numbers correctly	2	pts.
Process the numbers of each category correctly using nested loop	2	pts
Display the complete result	1	pt.
Question 2 (8 pts.)		
Algorithm 2 description	1	pt.
Prompt user and read data	1	pt.
Validate input data	1	pts.
Process menu options	4.5	pts.
Handle invalid menu options	0.5	pt.
TOTAL	**20**	**pts.**