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<b>Due Date:</b>	By 11:59pm October 12, 2018
<b>Evaluation:</b>	4% of final mark (see marking rubric at the end of handout)
<b>Late Submission:</b>	none accepted
<b>Purpose:</b>	The purpose of this assignment is to help you learn Java identifiers, assignments, input/output, selection and flow of control statements: if, if/else, switch, while, do while, for.
<b>CEAB/CIPS Attributes:</b>	Design/Problem analysis/Communication Skills

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**General Guidelines When Writing Programs:**

Refer to assignment #1 handout.

**Question 1 – Nested selection statements**

IELTS is a test developed by the world's leading experts in language assessment on 4 key English language skills: Listening, Reading, Writing and Speaking. It is designed to assess the language ability of people who aim to be integrated in an English-environment, like international students. The mark for each skill ranges from 1 to 9. The participants are scored whole (e.g., 5.0, 6.0, 7.0) or half (e.g., 5.5, 6.5, 7.5) bands in each skill. The average of the four skills (Listening, Reading, Writing and Speaking), produces the overall score. This score is rounded up or down to the nearest whole or half band.

**For example:**

- If you achieve 6.5 for Listening, 6.5 for Reading, 5.0 for Writing and 7.0 for Speaking, you will be awarded an overall score of  $25 \div 4 = 6.25$ , which is rounded up to 6.5.
- If you achieve 4.0 for Listening, 3.5 for Reading, 4.0 for Writing and 4.0 for Speaking, you will be awarded an overall score of  $15.5 \div 4 = 3.875$ , which is rounded up to 4.
- If you achieve 3.5 for Listening, 4.5 for Reading, 6.5 for Writing and 6.0 for Speaking, you will be awarded an overall score of  $20.5 \div 4 = 5.125$ , which is rounded down to 5.

Assume Concordia University has the following criteria for evaluating the English proficiency level of students who want to get admission:

- 1- If the overall score of an applicant is equal or above 6.5 and Reading and Writing scores are at least 6, the applicant is eligible for the admission.
- 2- If the overall score of an applicant is equal or above 6.5, and one or both scores of Reading and Writing skills are below 6, the applicant receives conditional admission (they have to take an English course in the first semester).

- 3- If the overall score of an applicant is 6, and both Reading and Writing scores are at least 6, the applicant receives conditional admission (they have to take an English course in the first semester).
- 4- If the overall score of an applicant is 6, and Reading and/or Writing scores are less than 6, the applicant must retake the exam.
- 5- If the overall score of an applicant is less than 6, the applicant must retake the exam.

In this question you are to design a language proficiency evaluation system for Concordia University. More precisely, you are asked to write a program that asks the applicants to enter their Speaking, Listening, Writing and Reading scores and then prints out their overall scores and whether they are eligible for the admission, they are given a conditional admission (they have to take an English course in the first semester), or they have to retake the IELTS exam.

The program should display a menu with 2 options at the beginning and prompt the applicant for their input:

- If the applicant selects the first option, the program explains the language proficiency requirements of Concordia for the admission.
- If the applicant selects the second option, the system asks for the scores of each skill, and calculates the overall score and shows the corresponding results (based on the above criteria).

**Hint for one possible way of rounding (up or down) the calculated overall score:**

You can consider following cases:

- 1- The difference between overall score and its integer part is less than 0.25. For example overall score is 6.23 and the integer part will be 6.0 (difference is 0.23). Then, the absolute value is considered as the overall score (6)
- 2- The difference between overall score and its integer part is between 0.25 to 0.75. For example overall score is 6.56 and the integer part will be 6.0 (difference is 0.56). Then, (integer part + 0.5) is considered as the overall score:  $(6+0.5=6.5)$
- 3- The difference between overall score and its integer part is between 0.75 to 1. For example overall score is 6.66 and its integer part will be 6.0 (difference is 0.66). Then, (integer part + 1) is considered as the overall score  $(6+1=7)$ .

Note that if the difference between overall score and its integer part is exactly 1, the overall score is actually a whole number and you do not need to round it up or down.

Here are a few sample outputs to illustrate the expected behaviour of your program:

Note: User input is highlighted in green.

-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----  
Welcome to Concordia Language Proficiency Evaluator!  
based on IELTS exam  
-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----

Here are the available options:

- 1 - Language Proficiency Requirements for the Applicant
- 2 - Evaluation of your language proficiency

Please enter the digit corresponding to your case: **1**

- The overall score of IELTS exam of applicants needs to be equal or above 6.5 and the scores for writing and reading skills should not be below 6.0. If your overall score is 6, and your reading and writing scores are at least 6, you will be eligible for conditional admission. So you need to take an English course in the first semester. Otherwise you have to retake the IELTS exam.

Thanks for choosing Concordia.

-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----  
Welcome to Concordia Language Proficiency Evaluator!  
based on IELTS exam  
-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----

Please select one of the following options:

- 1 - Language Proficiency Requirements for the Applicant
- 2 - Evaluation of your English Proficiency

Please enter the digit corresponding to your case: **2**

Please enter your listening score: **6**

Please enter your speaking score: **7**

Please enter your reading score: **6.5**

Please enter your writing score: **6**

Your overall score is: 6.5

Your reading score is: 6.5

Your writing score is: 6.0

Congratulations: You are eligible for Admission.

-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----  
Welcome to Concordia Language Proficiency Evaluator!  
based on IELTS exam  
-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----

Please select one of the following options:

- 1 - Language Proficiency Requirements for the Applicant
- 2 - Evaluation of your English Proficiency

Please enter the digit corresponding to your case: 2

Please enter your listening score: 5.5

Please enter your speaking score: 6.5

Please enter your reading score: 6.5

Please enter your writing score: 6

Your overall score is: 6.0

Your reading score is: 6.5

Your writing score is: 6.0

You are eligible for Conditional Admission.

-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----  
Welcome to Concordia Language Proficiency Evaluator!  
based on IELTS exam  
-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----\*\*\*\*-----

Please select one of the following options:

- 1 - Language Proficiency Requirements for the Applicant
- 2 - Evaluation of your English Proficiency

Please enter the digit corresponding to your case: 2

Please enter your listening score: 3.5

Please enter your speaking score: 4.5

Please enter your reading score: 5

Please enter writing score: 6

Your overall score is: 5.0

Your reading score is: 5.0

Your writing score is: 6.0

Sorry, you have to retake the exam.

## **Question 2: Integer Divisions & loop**

You are asked to write a Java program, which first calculates and prints out the sum of the digits of a number with at most 7 digits. Then it prints out all the divisors of the sum number that is calculated in the previous step.

Below is a sample output screen to illustrate the expected behaviour of your program. Your output does not need to be formatted in exactly the same way. Just make sure the required information appears.

Note: user input is highlighted in green.

```
Welcome to our Calculation Program!
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Enter a number with at most 7-digits: 1259955
Sum of the digits of 1259955 is: 36
The divisors of 36 are as follows:
1 2 3 4 6 9 12 18 36

Do you want to try another number? (yes to repeat, no to stop) yes
Enter a number with at most 7-digits: 125
Sum of number digits is: 8
The divisors of 8 are as follows:
1 2 4 8

Do you want to try another number? (yes to repeat, no to stop) no
Thanks and Have a Great Day!
```

Here is a recommended skeleton of the algorithm to solve this problem

1. Display welcome message/welcome banner
2. Prompt user a numbers with at most 7 digits
3. Calculate the summation of digits.  
Hint: You will need to use integer division and modulo to solve this problem (% and /).
4. Calculate the divisors of the number you calculated for the sum and print them one by one.
5. Ask the user if they want to try another addition.
  - If yes repeat from step 2
  - If no display a closing message

**Recommendation:** Take the time to write a complete algorithm before starting to program this question.

## Submitting Assignment 2

Please check your Moodle course webpage for instructions on how to submit the assignment.

### Evaluation Criteria for Assignment 2 (20 points)

<b>Source Code</b>	
<b>Comments for all 2 questions (3 pts.)</b>	
Description of the program (authors, date, purpose)	1 pts.
Description of variables and constants	1 pt.
Description of the algorithm	1 pts.
<b>Programming Style for all 2 questions (3 pts.)</b>	
Use of significant names for identifiers	1 pt.
Indentation and readability	1 pt.
Welcome Banner/Closing message	1 pt.
<b>Question 1 (7 pts.)</b>	
Prompting user/reading data	2 pt.
Calculation of the overall score	2 pt.
Evaluation of cases(accepted, conditional accepted, retake)	2 pt.
Display correct results	1 pt.
<b>Question 2 (7pts.)</b>	
Read in number	0.5 pts.
Digit sum (sum of digits)	2 pts.
Divisors calculation	2 pts.
Format of output	1 pts.
Repetition	1.5 pt.
<b>TOTAL</b>	<b>20 pts.</b>