**Fall 2022**

**CSC-121**

**Introduction to Computer Programming**

**Exam-2 (Practice)**

**Wednesday, October 12th 2022**

**Instructions:**

* Phones turned off and, on your desk, facing down.
* You can only use concepts covered in class.
  + You cannot use strings or any string operations.
* You are free to define and use any functions
* You can call any functions defined in any another question of this exam.

By signing below, I certify that the work on this exam is my own

**Printed Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Question 1** |
| Implement **csc121\_abs** function that accepts as input an integer **num** andreturns the absolute value of **num.** |
| * Raise relevant errors for invalid input types and values, with informative error messages. |
| * Write at least 5 test cases, covering a diverse set of scenarios. |

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| **Question 2** |
| Write a function **multiply** that accepts two inputs **x** and **y** and returns **x\*y,** implementedas ***repeated addition using while loops*.** |
| * If any of the inputs are not explicitly specified, use default value of 1. |
| * Raise relevant errors for invalid input types and values, with informative error messages. |
| * Write at least 7 test cases, covering a diverse set of scenarios. |

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| **Question 3** |
| Division Rules: Learn Divisor, Dividend, Quotient and RemainderWrite a function **divide** that accepts two inputs **dividend** and **divisor** and returns the **quotient**,implementing divisionas ***repeated subtraction using while loops*.**   |  | | --- | | * If any of the inputs are not explicitly specified, use default value of 1. | | * Raise relevant errors for invalid input types and values, with informative error messages. | | * Write at least 7 test cases, covering a diverse set of scenarios. |   Division - Grade 3 (with videos, worksheets, games & activities) | Repeated  subtraction, Subtraction, Math division |

**Question 4**

Write a function **convert\_to\_celsius** that takes as input temperature in Fahrenheit and returns the temperature in Celsius, using the following formula:

Don’t use multiplication operator (\*) and divide operator (/). Instead, use **multiply** and **divide** from Q2 and Q3.

**Question 5**

Implement a function **average\_of\_factorials** which accepts an input a number **n** and returns the sum of factorials computed using the following formula:

where i! = i \* (i - 1) \* (i - 2) \* … \* 1 and 0! = 1

In other words,

For example, for n=4:

avg\_of\_factorials(4) = 1/4 \* ((1) + (1\*2) + (1\*2\*3) + (1\*2\*3\*4))