Qatar University - College of Engineering

Department of Computer Science and Engineering

Computer Programming – Fall 2020

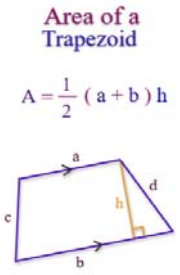
Instructor – Zeyad Ali (zali@qu.edu.qa)

HW #2 - Functions (Maximum 3 Students)

Student Name	
Student Name	
Student Name	
Grading	
Total (100)	

- *File names should be prog-1, prog-2, and so on.*
- Three Students Maximum. Minimum is TWO. No Exceptions.
- Only **one** online submission per group.
- No handwriting.
  - Past your code in the corresponding space.
- No LATE Submission.
- What to submit:
  - Fill all the answers in the attached answer sheet.
  - Also upload all the programs. (Use program names as instructed)
- Deadline Saturday 17-10 @ 8PM.

1. Write a Python program that uses a function to find the area of Trapezoid. The function receives three values a, b, and h as shown in the figure. The function returns the area to the caller.



2. Write a Python program that uses a function to find and return the factorial of a positive integer n. The function the receives a value and returns its factorial. If the passed parameter is negative, the function return the string "ERROR". Factorial of zero is one. Test your function.

If *n* is a positive integer, *n* factorial denoted by *n*! is a product of all positive integers less than or equal to *n*. It is defined by

$$n! = n(n-1)(n-2)...(2)(1)$$

As a special case: $0! = 1$

3. In a new program, use the function you wrote in question 2 to print the factorials of values from 1 to 10. Use for loop.

4. Write a Python program that uses a function to find and return maximum of three numeric values. The function receives three values and return max.

5. A prime number is a number that is only evenly divisible by itself and 1. For example, the number 5 is prime because it can only be evenly divided by 1 and 5. The number 6, however, is not prime because it can be divided evenly by 1, 2, 3, and 6.

   Write a Boolean function named is_prime which takes an integer as an argument and returns true if the argument is a prime number, or false otherwise. Use the function in a program that prompts the user to enter a number then displays a message indicating whether the number is prime.

6. In another program, use the function you wrote in question 5 to print the prime numbers between 1 and 100 using **for** loop.

7. Write a program that asks the user to enter five test scores. The program should display a letter grade for each score and the average test score. Write the following functions in the program:

   - **calc_average**. This function should accept five test scores as arguments and return the average of the scores. Invalid values are rejected and the user should be prompted to enter a valid value between 0 and 100.
   - **determine_grade**. This function should accept a test score as an argument and return a letter grade for the score based on the following grading scale:

Score	Letter Grade
90–100	A
80–89	B
70–79	C
60–69	D
Below 60	F