Programming Fundamentals

Lecture # 24

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Problem 1

- Write a program to find the largest number among 10 numbers entered by user. Use function to find larger value.

Problem 2

- Write a value-returning function, **isVowel**, that returns the value true if a given character is a vowel and otherwise returns false.

Problem 3

- Write a program that prompts the user to input a sequence of characters and outputs the number of vowels. (use the function **isVowel** created in previous example).

Problem 4

- Write a function, reverseDigit, that takes an integer as a parameter and returns the number with its digits reversed. For example, the value of reverseDigit(12345) is 54321; the value of reverseDigit(5600) is 65; the value of reverseDigit(7008) is 8007; and the value of reverseDigit(-532) is -235.

Problem 5

Write a program that takes as input five numbers and outputs the mean (average) and standard deviation of the numbers. If the numbers are x_1, x_2, x_3, x_4, and x_5, then the mean is $x = (x_1 + x_2 + x_3 + x_4 + x_5)/5$ and the standard deviation is:

$$s = \sqrt{\frac{(x_1 - x)^2 + (x_2 - x)^2 + (x_3 - x)^2 + (x_4 - x)^2 + (x_5 - x)^2}{5}}$$

Your program must contain at least the following functions: a function that calculates and returns the mean and a function that calculates the standard deviation.

Problem 6

- Write a function to calculate the factorial value of any integer entered through the keyboard

Problem 7

- Write a function **power (a, b)**, to calculate the value of **a** raised to **b**.

Problem 8

- Any year is entered through the keyboard. Write a function to determine whether the year is a leap year or not

Problem 9

12. During the tax season, every Friday, J&J accounting firm provides assistance to people who prepare their own tax returns. Their charges are as follows.

    a. If a person has low income (<= 25,000) and the consulting time is less than or equal to 30 minutes, there are no charges; otherwise, the service charges are 40% of the regular hourly rate for the time over 30 minutes.

    b. For others, if the consulting time is less than or equal to 20 minutes, there are no service charges; otherwise, service charges are 70% of the regular hourly rate for the time over 20 minutes.

(For example, suppose that a person has low income and spent 1 hour and 15 minutes, and the hourly rate is \$70.00. Then the billing amount is $70.00 \times 0.40 \times (45 / 60) = \$21.00$.)

Write a program that prompts the user to enter the hourly rate, the total consulting time, and whether the person has low income. The program should output the billing amount. Your program must contain a function that takes as input the hourly rate, the total consulting time, and a value indicating whether the person has low income. The function should return the billing amount. Your program may prompt the user to enter the consulting time in minutes.

Problem 10

6.12 *(Parking Charges)* A parking garage charges a $2.00 minimum fee to park for up to three hours. The garage charges an additional $0.50 per hour for each hour *or part thereof* in excess of three hours. The maximum charge for any given 24-hour period is $10.00. Assume that no car parks for longer than 24 hours at a time. Write a program that calculates and prints the parking charges for each of three customers who parked their cars in this garage yesterday. You should enter the hours parked for each customer. Your program should print the results in a neat tabular format and should calculate and print the total of yesterday's receipts. The program should use the function `calculateCharges` to determine the charge for each customer. Your outputs should appear in the following format:

```
Car       Hours       Charge
1           1.5         2.00
2           4.0         2.50
3          24.0        10.00
TOTAL      29.5        14.50
```

Problem 11

- Create a calculator that takes a number, a basic math operator (+,-,*,/,^), and a second number all from user input, and have it print the result of the mathematical operation. The mathematical operations should be wrapped inside of functions.

Problem 12

- Write a program that asks the user for an integer number and find the sum of all natural numbers up to that number using function.