**Lab 3**

**Decision statements**

1. Write a program that reads an integer and prints whether it is negative, zero, or positive.
2. Write a program that reads a floating-point number and prints “zero” if the number is zero. Otherwise, print “positive” or “negative”. Add “small” if the absolute value of the number is less than 1, or “large” if it exceeds 1,000,000.
3. Write a program that reads an integer and prints how many digits the number has, by checking whether the number is ≥ 10, ≥ 100, and so on. (Assume that all integers are less than ten billion.) If the number is negative, first multiply it with –1.
4. Write a program that reads three numbers and prints “all the same” if they are all the same, “all different” if they are all different, and “neither” otherwise.
5. Write a program that reads three numbers and prints “increasing” if they are in increasing order, “decreasing” if they are in decreasing order, and “neither” otherwise. Here, “increasing” means “strictly increasing”, with each value larger than its predecessor. The sequence 3 4 4 would not be considered increasing.
6. Write a program that prompts the user to provide a single character from the alphabet. Print Vowel or Consonant, depending on the user input. If the user input is not a letter (between a and z or A and Z), or is a string of length > 1, print an error message.
7. Write a program that asks the user to enter a month (1 for January, 2 for February, and so on) and then prints the number of days in the month. For February, print “28 or 29 days”.

Enter a month: 5

30 days

Do not use a separate if/else branch for each month. Use Boolean operators.

1. Write a program that translates a letter grade into a number grade. Letter grades are A, B, C, D, and F, possibly followed by + or –. Their numeric values are 4, 3, 2, 1, and 0. There is no F+ or F–. A + increases the numeric value by 0.3,   
   a – decreases it by 0.3. However, an A+ has value 4.0.

Enter a letter grade: B-

The numeric value is 2.7.

1. Write a program that reads in three floating-point numbers and prints the largest of the three inputs. For example:

Please enter three numbers: 4 9 2.5

The largest number is 9.

1. Write a program that reads in three strings and sorts them lexicographically.

Enter three strings: Charlie Able Baker

Able

Baker

Charlie

1. Write a program that reads in the x- and y-coordinates of two corner points of a rectangle and then prints out whether the rectangle is a square, or is in “portrait” or “landscape” orientation.
2. Write a program that reads in the x- and y-coordinates of three corner points of a triangle and prints out whether it has an obtuse angle, a right angle, or only acute angles.
3. Write a program that reads in the x- and y-coordinates of four corner points of a quadrilateral and prints out whether it is a square, a rectangle, a trapezoid, a rhombus, or none of those shapes.
4. Write a program to simulate a bank transaction. There are two bank accounts: checking and savings. First, ask for the initial balances of the bank accounts; reject negative balances. Then ask for the transactions; options are deposit, withdrawal, and transfer. Then ask for the account; options are checking and savings. Then ask for the amount; reject transactions that overdraw an account. At the end, print the balances of both accounts.
5. Body Mass Index: Write a program that calculates and displays a person’s body mass index (BMI). The BMI is often used to determine whether a person with a sedentary lifestyle is overweight or underweight for his or her height. A person’s BMI is calculated with the following formula:

*BMI = Weight X 703 / Height2*

where weight is measured in pounds and height is measured in inches. The program should display a message indicating whether the person has optimal weight, is underweight, or is overweight. A sedentary person’s weight is considered optimal if his or her BMI is between 18.5 and 25. If the BMI is less than 18.5, the person is considered underweight. If the BMI value is greater than 25, the person is considered overweight.

1. Write a program that has variables to hold three test scores. The program should ask the user to enter three test scores and then assign the values entered to the variables. The program should display the average of the test scores and the letter grade that is assigned for the test score average. Use the grading scheme in the following table:

A picture containing graphical user interface

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