Lab Session 12

Question 1: Part 1 – Bank service charge

You are writing an application for a bank. It wants to assess a service charge for cashing a check, where the service charge depends on the amount of the check.

* if the check value < 10, charge 1%
* if greater than or equal to 10 but less than 100, charge 10% of the check value
* if greater than or equal to 100 but less than 1000, charge $5 plus 5% of the check value
* if over 1000, charge 40 plus 1%

Ask the user for the check value and display the check value as well as the service charge. NOTE: Use else-if statements efficiently!!!

**Sample run:**

Check value: 98.0

Service charge 9.8

**Question 1: Part 2 – On paper:**

Given these declarations and initializations:

boolean found = true;

double hours = 45.3, overtime = 15.;

int count = 20;

char ch = ‘B’;

To what will these expressions evaluate?

!found

hours > 40.0

!found && (hours>=0)

!(found && (hours >=0))

hours + overtime <= 75

(count >= 0) && (count <= 100)

(ch >= ‘A’ && ch <=‘Z’)

10 < count < 30

**Question 2 –Quadratic equation**

A quadratic equation has the general form: *ax2 + bx + c = 0*

and has real roots given by and provided that *b2 – 4ac > 0* and *a ≠ 0*. If *b2 – 4ac = 0,* then the real root is found by solving the linear equation *(i.e.,*)

Write a program that asks the user for a, b, and c, and that prints the real roots, if possible, otherwise print “No real roots”.

**Question 3 –Rock paper scissors (part 1)**

Rock paper scissors is a game played between 2 players. Each player counts to 3 and then displays 1 of 3 options using symbols on their hands: rock, paper, or scissors.

-If the 2 players say the same thing, then the game is a tie.

-If one player has rock and the other has scissors, the player with rock wins

-If one player has scissors and the other has paper, the player with scissors wins

-If one player has paper and the other other has rock, the player with rock wins.

Write a 2 player game of rock paper scissor. The program should ask the first player what choice he/she wants to make. It should then ask the 2nd player for a choice. Then, it determines who wins.

Hint: Remember the correct way to compare the values of 2 Strings!

**Question 4 –Rock paper scissors (part 2)**

Now write an artificial intelligence program that cheats at rock paper scissors. The program will now be a 1 player game. The program should ask the user to enter one of the 3 options. The computer program should then choose for its turn whatever option wins. Finally it should print “I always win! Hahahahah!”

Variation: Write a program that always *loses* at rock paper scissors

Question 5 – Quadrants

Recall that a two dimensional coordinate is considered in the first quadrant if both the x and y coordinates are positive, the 2nd quadrant if x is negative and y is positive, the 3rd quadrant if both are negative, and the 4th quadrant if x is positive and y is negative.

Write a program that asks the user to enter 2 numbers, representing the x and y coordinates of a number. The program should then print what coordinate the point is in.