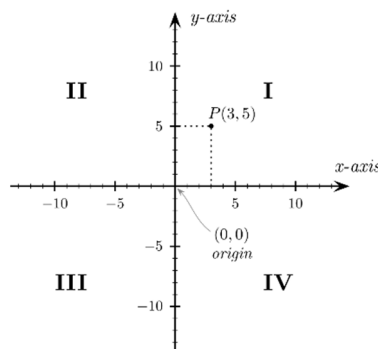## Computer Programming Language

【Fall, 2020】

Homework 2

Program A：Point in an XY coordinate system (25%)

Write a program to accept a coordinate point (x, y) in an XY coordinate system and determine in which quadrant or axis the coordinate point lies. You need to display a message telling either an axis on which the point lies or the quadrant in which it is found.

■ *Sample Input/Output*

input	-3.0 -7.6
output	The point (-3.0, -7.6) is in quadrant III.

input	0.0 15.3
output	The point (0.0 15.3) is on the y-axis.

■ *AUTOLAB Submission Check:*

int answer1; // Store the number of the quadrant where the coordinate point lies;

// Set this number to 5 if the point lies on the x-axis;

// Set this number to 6 if the point lies on the y-axis;

// Set this number to 7 if the point is the origin (0,0).

Program B：Simple integer encryption (25%)

A company that wants to send data over the Internet has asked you to write a program that will encrypt it so that it may be transmitted more securely. All the data is transmitted as 4-digit integers. Your program should read a 4-digit integer input (1000 ~ 9999) by the user and encrypt it as follows: Replace each digit with the result of adding 7 to the digit and getting the remainder after dividing the

new value by 10. Then swap the first digit (leftmost digit) with the second digit, and swap the third digit with the fourth digit to create the encrypted 4-digit integer. Output the encrypted integer to the screen. Your program should handle input errors if the user's input is not a 4-digit integer, and the error messages should be clear and informative.

■ *Sample Input/Output*

input	7215
output	9428 is the encrypted integer of 7215

■ *AUTOLAB Submission Check:*

    int answer1;   // Store the number of the first digit after encryption.

    int answer2;   // Store the number of the second digit after encryption.

    int answer3;   // Store the number of the third digit after encryption.

    int answer4;   // Store the number of the fourth digit after encryption.

    int answer5;   // Set this number to 1 if correctly input; otherwise set this number to 0

Program C：Bowling score calculation (25%)

The rules of bowling are that if the first throw is a strike (all 10 pins knocked down), then the score is equal to those 10 points plus the number knocked down in the next two throws. Thus the maximum score (three strikes) is 30. If the first throw knocks down fewer than 10 pins, but the second throw knocks down the remainder of the 10 pins (a spare), then the score is those 10 points plus the number of pins knocked down on the third throw. If the first two rows fail to knock down all of the pins (a blow), then the score is just the total number of pins knocked down in the first two throws.

Write a program that takes three input numbers representing the number of pins knocked down by a bowler in three throws. Calculate and output the score, an also check for erroneous input. For example, a throw must be in the range of 0 through 10 pins, and the total of the first two throws must be less than or equal to 10, except when the first throw is a strike. Be sure to use proper formatting and appropriate comments in your code. The output should be formatted neatly, and the error messages should be clear and informative.

■ *Sample Input/Output*

input	7 3 9
output	The score is 19 (a spare).

input	10 9 1
output	The score is 20 (a strike).

input	10 9 8
output	Erroneous input!

■ *AUTOLAB Submission Check:*

    int answer1;   // Store the score of the three throws
    int answer2;   // Set this number to 1 if correctly input; otherwise set this number to 0

Program D：Game of blackjack (25%)

In the game of blackjack, the cards 2 through 10 are counted at their face values, regardless of suit; all face cards (jack, queen, and king) are counted as 10; and an ace is counted as a 1 or 11, depending on the total count of all cards in a player's hand. The ace is counted as 11 only if the resulting total value of all cards in a player's hand doesn't exceed 21; otherwise, it's counted as 1. Using this information, write a C++ program that accepts three card values as inputs (a 1 corresponding to an ace, a 2 corresponding to a two, and so on), calculates and display the total value of the hand, and the sum of the three cards.

■ *Sample Input/Output*

input	1 3 6
output	The total value of the hand is 20.

input	1 7 1
output	The total value of the hand is 19.

input	7 10 6
output	The total value of the hand is 23 (bust).

■ *AUTOLAB Submission Check:*

    int answer1;   // Store the total value of the hand
    int answer2;   // Store the sum of the three input integers

Notes:

1. Please submit your programs (source codes) to the AUTOLAB grading system website (http://140.112.183.225) before **Oct. 22** (3:30PM)

2. Late submission will have a penalty of 10% discount per day of your homework total score toward a maximum of 50% discount. No late submission over five days will be accepted.

3. Criteria of grading include: (1) Program functionality; (2) User interface; (3) Structure of the program; (4) Suitable comments; (5) Programming style; (6) Creativity.