

Lab 2 (Practice)

Operators, basic I/O, conditional statements

NOTE: In all the following exercises, the input entered by the user is highlighted by underline. It is not part of the output from the program.

Q1. Operators, basic I/O

Write a program that read a four-digit number and print the sum of squares of digits. Expected output of the program is as follows:

Enter a number of four digits: <u>4567</u> Sum of digits is: 126

Hint-1: For example, input a number $N = 4567$, the output should be $4^2 + 5^2 + 6^2 + 7^2 = 126$.

Hint-2: Use % and / operators.

Q2. Operators, basic I/O

a) Write a program that inputs a temperature in Celsius (data type: double) and outputs it in Fahrenheit (data type: double). Expected output of the program are as follows:

Enter temperature in Centigrade: <u>27</u> Temperature in Fahrenheit is: 80.60

Hint-1: Use the following formula to convert Celsius to Fahrenheit:

$$Fahrenheit = (9/5) * Celsius + 32$$

Hint-2: You need to control the float/double printing precisions using `setprecision()`.

b) Extend the program of part-a and convert calculated Fahrenheit into Kelvin (data type: double). Expected output of the program are as follows:

Enter temperature in Centigrade: <u>27</u> Temperature in Fahrenheit is: 80.60 Temperature in Kelvin is: 300.15

Hint-1: Use the following formula to convert Fahrenheit to Kelvin:

$$Kelvin = (Fahrenheit + 459.67) * 5/9$$

Hint-2: You need to control the float/double printing precisions using `setprecision()`.

Q3. Operators, basic I/O conditional statements

Write a program to judge whether the two input straight lines have any intersections. The input data includes the coordinate of four points. First two points are on the first line, while the remaining two are the other line. We may say if the difference between the slopes of the two lines are less than 0.0001, the two lines are parallel, which means that they have no intersections.

NOTE: In addition, if the difference between the x coordinates of the two points on one line are less than 0.0001, the line is perpendicular to the x-axis. If two lines are both perpendicular to the x-axis, the two lines are parallel.

Expected Outcomes

Example 1
Enter the points on the first line: <u>3</u> <u>4</u> <u>6</u> <u>7</u> Enter the points on the second line: <u>2</u> <u>0</u> <u>0</u> <u>2</u> The two straight lines have an intersection.
Example 2
Enter the points on the first line: <u>4</u> <u>0</u> <u>4</u> <u>6</u> Enter the points on the second line: <u>2</u> <u>4</u> <u>2</u> <u>-4</u> The two straight lines have no intersections.

NOTE: we explain the meaning of Example 1 as the demonstration of the input. 3 is the x coordinate of the first point on the first line, while 4 is the y coordinate of the point. We can know that the first point is (3, 4). Then the input gives the coordinate of the second point on the first line in the same way, which means the coordinate of the second point is (6, 7). Then the coordinates of the two points on the second line are given in the exact same format. The two points on the second line are (2, 0), and (0, 2).