LAB 5

1. Write a C++ program that declares an array of 50 components of type double. Then, write a function to initialize the array so that the first 25 components are equal to the square of the index variable, and the last 25 components are equal to three times the index variable. Output the array so that 10 elements per line are printed.

2. Write a C++ function, **getSmallestIndex** , that returns the index of the first occurrence of the smallest element in the array. Also, write a program to test your function.

3. Write a C++ function, **getLargestIndex** , that returns the index of the last occurrence of the largest element in the array. Also, write a program to test your function.

4. The following formula gives the distance between two points,(x1,y1) and (x2,y2) in the Cartesian plane: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

   Given the center and a point on the circle, you can use this formula to find the radius of the circle. Write a program that prompts the user to enter the center and a point on the circle. The program hould then output the circle's radius, diameter, circumference, and area. Your program must have at least the following functions:

   a) **getDistance**: This function takes as its parameters four numbers that represent two points in the plane and returns the distance between them.

   b) **gerRadius**: This function takes as its parameters the center and a point on the circle, calls the function **getDistance** to find the radius of the circle, and returns the circle's radius.

   c) **getCircumference**: This function takes as its parameter the radius of the circle and returns the circle's circumference.

   d) **getArea**: This function takes as its parameter the radius of the circle and returns the circle's area.

5. Consider the definition of the function main .

```
int main()
{
int x, y;
char z;
double rate, hours;
double amount;
.
.
.
}
```

The variables x , y , z , rate , and hours referred to in items a through f below are the variables of the function main . Each of the functions described must have the appropriate parameters to access these variables. Write the following definitions:

a) Write the definition of the function **initialize** that initializes x and y to 0 and z to the blank character.

b) Write the definition of the function **getHoursRate** that prompts the user to input the hours worked and rate per hour to initialize the variables hours and rate of the function main.

c) Write the definition of the value-returning function **payCheck** that calculates and returns the amount to be paid to an employee based on the hours worked and rate per hour. The hours worked and rate per hour are stored in the variables hours and rate , respectively, of the function main. The formula for calculating the amount to be paid is as follows: For the first 40 hours, the rate is the given rate; for hours over 40, the rate is 1.5 times the given rate.

d) Write the definition of the function **printCheck** that prints the hours worked, rate per hour, and the salary.

e) Write the definition of the function **funcOne** that prompts the user to input a number. The function then changes the value of x by assigning the value of the expression 2 times the (old) value of x plus the value of y minus the value entered by the user.

f) Write the definition of the function **nextChar** that sets the value of z to the next character stored in z .

g) Write the definition of a function main that tests each of these functions.