ITC(B)
Assignment #3

Deadline: April 5, 2018

Question #1:
This program reads 20 numbers and outputs the number of
// zeros, odd, and even numbers.

//Function prototypes
void initialize(int& zeroCount, int& oddCount, int& evenCount);
void getNumber(int& num);
void classifyNumber(int num, int& zeroCount, int& oddCount,
int& evenCount);
void printResults(int zeroCount, int oddCount, int evenCount);

Questions #2:

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.

Question #3:

Write a function that prints the day number of the year, given the date in the form month-day-year. For example, if the input is 1-1-2006, the day number is 1; if the input is 12-25-2006, the day number is 359. The program should check for a leap year. A year is a leap year if it is divisible by 4, but not divisible by 100. For example, 1992 and 2008 are divisible by 4, but not by 100. A year that is divisible by 100 is a leap year if it is also divisible by 400. For example, 1600 and 2000 are divisible by 400. However, 1800 is not a leap year because 1800 is not divisible by 400.

Question #4:

The cost to become a member of a fitness center is as follows: (a) Senior citizens discount is 30%, (b) If membership is bought and paid for 12 or more months, the discount is 15%, (c) If more than five personal training sessions are bought and paid for, the discount on each session is 20%.
Write a menu-driven program that determines the cost of a new membership.Your program must contain a function that displays the general information about the fitness center and its charges; a function to get all of the necessary information to determine the membership cost; and a function to determine the membership cost. Use appropriate parameters to pass information in and out of a function. (Do not use any global variables.)

Question #5:

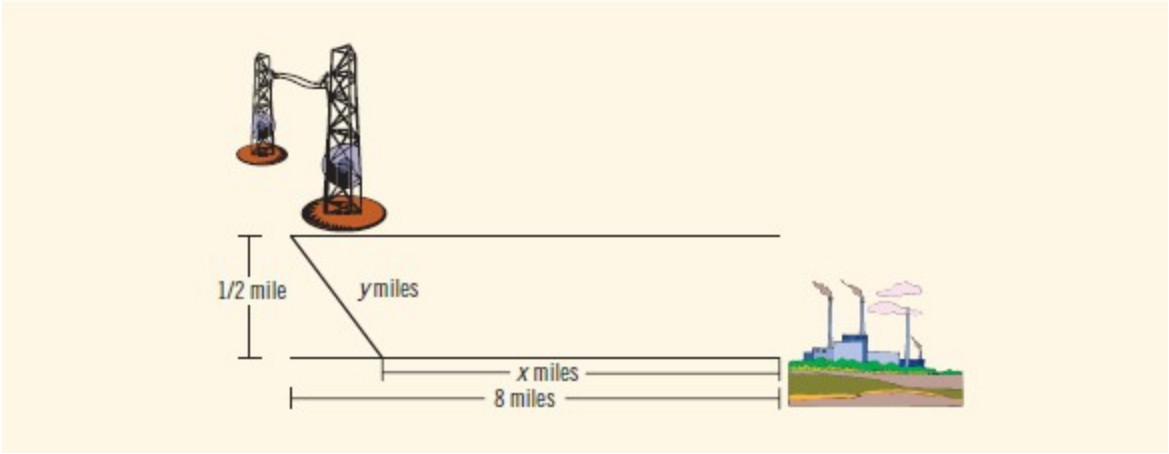
Write a program that outputs inflation rates for two successive years and whether the inflation is increasing or decreasing. Ask the user to input the current price of an item and its price one year and two years ago. To calculate the inflation rate for a year, subtract the price of the item for that year from the price of the item one year ago and then divide the result by the price a year ago. Your program must contain at least the following functions:
a function to get the input, a function to calculate the results, and a function to output the results. Use appropriate parameters to pass the information in and out of the function. Do not use any global variables.

Question #6:

Write a program to convert the time from 24-hour notation to 12-hour notation and vice versa. Your program must be menu driven, giving the user the choice of converting the time between the two notations. Furthermore, your program must contain at least the following functions: a function to convert the time from 24-hour notation to 12-hour notation, a function to convert the time from 12-hour notation to 24-hour notation, a function to display the choices, function(s) to get the input, and function(s) to display the results. (For 12-hour time notation, your program must display AM or PM.)

Question #7:

A power station is on one side of a river that is one-half mile wide, and a factory is eight miles downstream on the other side of the river (see Figure 7-21). It costs $7 per foot to run power lines over land and $9 per foot to run them under water. Your objective is to determine the most economical path to lay the power line. That is, determine how long the power line should run under water and how long it should run over land to achieve the minimum total cost of laying the power line.



Write a program that prompts the user to enter:
a. The width of the river
b. The distance of the factory downstream on the other side of the river
c. The cost of laying the power line under water
d. The cost of laying the power line over land
The program then outputs the length of the power line that should run under water and the length that should run over land so the cost of constructing the power line is at the minimum. The program should also output the total cost of constructing the power line.