**FAST-NUCES**

Fall Term **2023**

**Programming Fundamentals (B section)**

**Assignment 2**

**Total marks 70**

**Note:** Do not copy code from internet or any other source even across the sections. I will check the plagiarism of the assignment and it will capture the cheated code from internet or copied from class fellows. Those who will try they will get some marks for their effort even you do not get perfect solution. Copied & Shared work will score in negative grading. The assignment should be in cpp. After submission, no excuse will be entertained. No assignment will be accepted after due

date.

**Write C++ code of the following:**

**Q1)**Write a program that plays a word game with the user. The program should ask the user to enter the following: 10

● His or her name

● His or her age

● The name of a city

● The name of a college

● A profession

● A type of animal

● A pet’s name

After the user has entered these items, the program should display the following story, inserting the user’s input into the appropriate locations: There once was a person named NAME who live in CITY . At the age of AGE , NAME went to college at COLLEGE . NAME graduated and went to work as a PROFESSION . Then, NAME adopted a(n) ANIMAL named PETNAME. They both lived happily ever after!

**Q2)**Last month Joe purchased some stock in Acme Software, Inc. Here are the details of purchase 15

● The number of shares that Joe purchased was 1,000.

● When Joe purchased the stock, he paid $45.50 per share.

● Joe paid his stockbroker a commission that amounted to 2% of the amount he paid for the stock.

● Two weeks later Joe sold the stock. Here are the details of the sale:

● The number of shares that Joe sold was 1,000.

● He sold the stock for $56.90 per share.

● He paid his stockbroker another commission that amounted to 2% of the amount he received for the stock.

**Q3)** The cost of renting a room at a hotel is, say $100.00 per night. For special occasions, such as a function or conference, the hotel offers a special discount as follows: If the number of rooms booked is at least 10, the discount is 10%; at least 20, the discount is 20%; and at least 30, the discount is 30%. Also if rooms are booked for at least three days, then there is an additional 5% discount. Write a program that prompts the user to enter the cost of renting one room, the number of rooms booked, the number of days the rooms are booked, and the sales tax (as a percent). The program outputs the cost of renting one room, the discount on each room as a percent, the number of rooms booked, the number of days the rooms are booked, the total cost of the rooms, the sales tax, and the total billing amount. Your program must use appropriate named constants to store special values such as various discounts. 15

**Q4) Collinear points** are the points that lie on the same line. If two or more than two points lie on a line close to or far from each other, then they are said to be collinear. 20

**The formula for Collinear points**

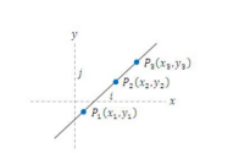
There are two methods to find the collinear points. They are:

• Slope Formula

• Area of triangle

**Using Slope Formula:** Three or more points are said to be collinear if the slope of pairs of points is the same. Suppose, X, Y and Z are the three points, with which we can form three sets of pairs, such that, XY, YZ and XZ are three pairs of points. Then, as per the slope formula, If Slope of XY = Slope of YZ = Slope of XZ, then the points X, Y and Z are collinear.

**Note:** The slope of the line segment joining two points, say P1(x1, y1) and P2(x2, y2), is given by the formula: m = (y2 – y1) / (x2 – x1)



**Using the Area of Triangle Formula:** If the *area of triangle* formed by three points is zero, then they are said to be collinear. It means that if three points are collinear, then they cannot form a triangle. Suppose the three points P(x1, y1), Q(x2, y2), and R(x3, y3) are collinear; then by remembering the formula of the area of triangle formed by three points we get;

(1/2) [x1(y2 – y3) + x2(y3 – y1) + x3(y1 – y2)] = 0

**Task 1:** Write a C++ program to compute whether the given points are collinear or not by using slope method.

**Task 2:** Write a C++ program to compute whether the given points are collinear or not by using area of triangle method.

**Q5)** Implement a program that directs a cashier how to give change.

The program has two inputs:

● the amount due.

● the customer's receipt.

Display the dollars, quarters, dimes, nickels, and pennies that the customer should receive in return. In order to avoid round off errors, the program user should supply both amounts in pennies, for example 274 instead of 2.74. 10 GOOD LUCK