STUDENT ID:.....

IP ADDRESS :.....

MACHINE NUMBER :.....

Sri Lanka Institute of Information Technology

B. Sc. Honours Degree/ Diploma
in
Information Technology

Final Examination
Year 1, Semester 1 - 2019

IT1010 - Introduction to Programming
Paper 1A

Duration: 3 Hours

Instructions to Candidates

- This paper has **four** questions. Attempt all four questions.
- Total marks is 100.
- You need to save your programs with the given file name. First check the file name and use the vi editor to create the file.
- Do not create any folders in your login.
- Include your IT number in all your programs.
- DO NOT TAKE THE PAPER FROM THE EXAMINATION HALL.

Question 1 **(20 marks)**

"Taste Me" pizza shop makes pizzas in two types and two sizes as shown below.

Pizza Type	**Large (LKR)**	**Medium(LKR)**
1 – Classic range	1720.00	975.00
2 –Signature range	1820.00	1000.00

This pizza shop offers discounts for the customers as given below.

Credit card	20%
Loyalty card	15%
Online orders	5%
Other	0%

You are asked to write a program to print the invoice for the pizza orders. One invoice can have many orders of the same customer.
Write a C program to do the following.

a) Input the pizza type (1 or 2), size (L or M) and the number of pizzas the customer wants to buy from the keyboard. Display an error message if the user inputs an invalid pizza type or a size.

b) Calculate the cost of the pizzas purchased.

c) Modify the program to allow to enter details (pizza type (1 or 2), size (L or M) and number of pizzas) of multiple orders. Stop entering the order details when the customer input -1 as the pizza type.

d) Allow the user to input form the keyboard, whether the customer use a credit card (C), loyalty card (L) or whether it is an online order (O) as shown below. A customer can belong to many categories. But entitle for only one discount. Select the highest discount percentage.

```
Are you paying by credit card  (Y/N)  ? N
Are you a loyalty customer (Y/N)? Y
Is this an online order (Y/N)?  N
```

e) Calculate and display the following

i) Bill amount – total amount of the pizzas purchased

ii) Discount – discount amount based on the customer type
iii) Net amount – Amount to be paid after discount

Save your program as 1AQ1.c

Sample output of the program

```
Input pizza type : 1
Input the pizza  size : L
Input the number of pizzas : 2

Input pizza type : 1
Input the pizza  size : M
Input the number of pizzas : 1

Input pizza type : -1

Are you paying by credit card  (Y/N)  ? N
Are you a loyalty customer (Y/N)? Y
Is this an online order (Y/N)?  N

Total bill  amount: 4415.00
Discount:662.25
Net amount:3752.75
```

Question 2 **(30 marks)**

Part 1

Write a C program to fill the following array to represent a Fibonaci series.

0	1	1	2	3	5	8	13	21	34

a) Create an array called **fib** of size 10.
b) Initialize first two array elements with 0 and 1 respectively.
c) Fill the other array elements as follows using a **repetition** structure.
   fib[2] = fib[0] + fib[1]
   fib[3] = fib[1] + fib[2]
   fib[4] = fib[2] + fib[3]
   ……..
   ……..
d) Display the output as shown in the above figure.

Save your program as 1AQ2a.c

Part 2

A 2D array is used to store the details of the rating of 3 movies given by 4 reviewers. Some sample data is shown below.

		Reviewers 1			
Movies	1	4	6	2	5
	2	7	9	4	8
	3	6	9	3	7

Write a C program to do the following.

a) Declare an array called **ratings** to store the details of the rating of 3 movies given by 4 reviewers.
b) Read the movie ratings from the key board and store the data in the array.
c) Display the array in tabular format.
d) For each movie display the movie number and the average rating.
e) Find and display the movie which received highest average rating.

Save your program as 1AQ2b.c

Question 3 **(30 marks)**

Write a C program to find out the amount you earn after investing money on a trust fund for a given period.

a) Write a function called `calcAnnualInterest()` to calculate the interest amount the customer gets at the end of the year when the annual interest rate and the amount is passed as parameters. If the amount is above Rs. 1,000,000.00, an additional 0.5% is added to the interest rate.

```
float calcAnnualInterest(float interestRate, float amount);
```

interest = amount * interest rate /100

b) Write a function called `findTotalAmount()` to return the total amount saved at the end of the year.

```
float findTotalAmount(float interestRate, float amount);
```

Hint: Total amount = interest + amount
Use calcAnnualInterest function to find out the interest earned.

c) Write a function called `testTotalAmount()` which contains two assert statements to check the function implemented in section b) above.

```
void testTotalAmount();
```

d) In your main function,

i) Call `testTotalAmount()` function

ii) Input the amount to be invested and the annual interest rate from the keyboard.

iii) Customer is planning to invest the amount compounded yearly at the given interest rate for five years.
i.e. (Amount + interest) is invested for the next year.

Display the total amount earned at the end of each year using the above functions.

Sample output is given below.

```
Enter Initial Amount to be invested       : 10000.00
Enter Annual interest Rate(in percentage) : 10
```

```
Amount after year 1 :  11000.00
Amount after year 2 :  12100.00
Amount after year 3 :  13310.00
…..
…..
```

Save your program as 1AQ3.c

Question 4 **(20 marks)**

A text file can be used to record the details of loyalty customers. Follow the following steps to create a file called "loyalty.dat"

a) Create a file called "loyalty.dat" using the vi editor with the following data.

7728369210 Dinesh 7773457219 Subash

b) Write a C program to
   i) Input the name and the loyalty number from the keyboard.
   ii) Read the file and check whether the loyalty number already exists.
   iii) If the new number does not exist, append the loyalty number and the name to the file.
   iv) Add details of five people and store those in the file if needed.

Save your program as 1AQ4.c

Grading Sheet

Question 1

Compile correctly	1.0
Execute correctly	
- Inputs	0.5
- Outputs	2.0
Correct use of repetition	4.0
Correct processing	
- Use of selection	4.0
- Correct calculation	4.0
Display error message	1.0
Display the outputs	1.0
Formatting the output	0.5
Coding conventions	2.0

Question 2

Compile correctly	1.0
Execute correctly	
- 1D array output	2.0
- 2D array input	1.0
- 2D array	
tabular format	0.5
average	0.5
Highest rated movie	1.0
1D array	
- Create and initialize	1.5
- Calculate the number series	6.0
- Display output	2.0
2D array	
- Define array	0.5
- Input values	1.0
- Display array	2.0
- Calculations	
Averages	3.0
Highest rated movie	6.0
Coding conventions	2.0

Question 3

Compile correctly	1.0
Execute correctly	
- Inputs	0.5
- Outputs	2.0
Implement function 1	5.5
Implement function 2	5.0
Implement test function	6.0
In main program	
- Take inputs	1.0
- Call functions in correct order	6.0
- Display output	1.0
Coding conventions	2.0

Question 4

Compile correctly	1.0
Executes correctly	
-write data	2.0
Open the file	2.0
Read values from the key board	2.0
Find the loyalty number already exists	6.0
Write data if not exist	3.0
Handle multiple records	2.0
Coding conventions	2.0