

STUDENT ID:

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MACHINE NUMBER:



Sri Lanka Institute of Information Technology

B.Sc. Honours Degree / Diploma

in

Information Technology

Final Examination

Year 1, Semester 1 (2023)

IT1010 – Introduction to Programming

Session 2 - Version A

Duration: 3 Hours

May 2023

Instructions to Candidates:

- ◆ This paper has 4 questions. Attempt all 4 questions.
- ◆ The total marks for the paper is 100.
- ◆ This paper contains 8 pages, including the cover page.
- ◆ Save all the programs in the folder given in your desktop with the given file name.
- ◆ Include your IT number in all your programs
- ◆ DO NOT TAKE THIS PAPER FROM THE EXAMINATION HALL

Question 1

(20 Marks)

“Grand Family Restaurant” is providing several birthday packages as follows. According to the package different facilities will be provided and total amount for the event will be differ with facilities requested from the user.

Package ID	Description	Price Criteria
1	Play Zone Birthday	Number of guests * 450.00
2	Laser Tag Birthday	Number of guests * 570.00 up to 15 guests (including 15) and rate will increase to 640.00 for more than 15 guests (The event can have at most 30 participants in this package)
3	Deluxe Birthday	Number of guests * 800.00 and 1kg. birthday cake if requested and fire work as per the request
4	Super Deluxe Birthday	Number of guests * 1050.00 and one unique framed photograph (900.00 per one) for all the guests presented. If user requested this photograph facility, user will be given 15% discount from the total charge.

Write a C program to

- Input the package ID and the relevant details according to the package ID , based on that calculate the total charge for the birthday event.

Note: Consider the payment for 1 kg. birthday cake as Rs. 2800.00 and the charges for fire work will be Rs. 2400.00.

- Your program should display the total charge for the event to 2 decimal points.
- Program should continue the execute until user enter -99 as the package ID
- If the user has input an invalid package type, terminate the program.

Save your program as 2AQ1.c

Sample Output 1

Enter package ID:1

Enter no of guests:2

You have selected package ID: 1

Total charge for the event: 900.00

Enter package ID:4

Enter no of guests:5

Do you need a photograph (Y/N):y

You have selected package ID: 4

Total charge for the event: 8287.50

Enter package ID:6

Invalid package ID

Sample Output 2

Enter package ID:2

Enter no of guests:4

You have selected package ID: 2

Total charge for the event: 2280.00

Enter package ID:-99

Question 2

(30 Marks)

Part A

You are supposed to write a program that needs to keep track of the marks of students. Write a C program that does the following.

- i. Create an array called **marks** that can store the marks of 8 students.
- ii. Read 8 marks from the keyboard and store in the array.
- iii. Calculate and display the following
 - a. Average mark of the students in the class
 - b. Highest mark of the class.
 - c. Number of students who obtained marks higher than the average mark.
 - d. The difference between highest and lowest marks of the students.

Example input array: {50.0, 65.0, 35.0, 90.0, 45.0, 75.0, 80.0, 60.0}

Example output:

Average mark: 62.5

Highest mark : 90.0

Number of students who obtained marks higher than the average mark: 4

The difference between highest and lowest marks of the students: 55.0

Part B

In image processing, images are often represented as 2D arrays where each element of the array represents the pixel value at that location. The binary images store 1 and 0 to represent the color (black or white) at that location.

Write a C program that does the following.

- i. Declare an array called **image** with 5 rows and 5 columns which can store 1s and 0s.
- ii. Read the values from the keyboard and store them in the array.
- iii. Display the content of **image** array in the tabular format
- iv. Calculate and display the number of 2 by 2 squares filled with all 1s. Overlapping squares should be considered.

Example

1	1	0	0	0
1	1	0	1	1
1	1	1	1	1
0	0	1	1	0
0	0	0	1	1

Number of 2 by 2 squares filled with all 1s = 4

Save your program as 2AQ2.c

Question 3**(30 Marks)**

In the festive season from December 23rd till 25th FashionStar Clothing shop provide discounts for card a, b and c under following rates

Date	Card types	Discount
23	a	20%
24	b	25%
25	c	30%
26	b, c	20%

**Note that for other dates except above dates there will be no discount for any card type*

- i. Write a C program to Calculate **paymentAmount()** to calculate Total payable amount after deducting discount.

Function prototype is given below

paymentAmount(int date, char cardType, double amount)

Clothing shop also decide to provide loyalty cards according to the Total payable amount after deducting the discount.

Total Payment	Loyalty card type
> 25 000	Gold
10 000 - 25 000	Silver
<10000	Bronze

- ii. Write a function named **displayLoyaltytype()** to display the card type obtained by each customer.
- void displayLoyaltytype(double payment)**
- iii. Write a function called **testpaymentAmount()** which contain 3 assert statements to debug the implemented **paymentAmount(int date, char cardType, double amount)** function.
- iv. In your main function do the following:
- Enter the Date, card type and amount (before discount) from the keyboard.
 - Call function **paymentAmount()** ,**displayLoyaltytype()** and **testpaymentAmount()** in your main function.

Save your program as 2AQ3.c

Question 4

(20 Marks)

An online shop uses a text file to record the details of their customers. For each customer following details will be saved

Customer ID

Customer Name

Telephone number

- a) Create a file called "customers.dat" using following data.

1	Asanka	778964534
2	Dinesh	712345678
3	Niroma	774562899

- b) Write a C program to

- i) Input the CustomerID, Customer Name and Telephone number from the keyboard.
- ii) Read the file and check whether the CustomerID already exists.
- iii) If the new CustomerID does not exist, append the Customer ID , Customer name and Telephone number to the file.
- iv) Add details of 2 more customers and store those in the file.

Save your program as 2AQ4.c

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 - input	1.0
- 1D array - display	2.0
- 2D array - input	1.0
- 2D array - display	2.0
1D array	
- creation	1.0
- insert values	1.0
- functionality implementation	6.0
- Display output	2.0
2D array	
- creation	1.0
- insert values	2.0
- functionality implementation	6.0
- Display output	2.0
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	1.0
- Outputs	2.0
File write	
- Open file for writing	1.0
- Take input from the keyboard	2.0
- Write to the file	2.0
- Handle multiple records	1.0
File read	
- Open file for reading	1.0
- Read file as lines	2.0
- Search	3.0
- Handle multiple records	1.0
- Display output	1.0
Coding conventions	2.0