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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 B

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 9 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 ID	Description	Price Criteria
1	Bronze Birthday	Number of guests * 500.00
2	Rainbow Birthday	Number of guests * 600.00 up to 20 guests (including 20) and rate will increases to 640.00 for more than 20 guests (The event can have at most 40 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 * 2000.00 and one unique framed photograph (1000.00 per one) for all the guests presented. If user requested this photograph facility, user will be given 15% discount from the total charge.

package different facilities will be provided and total amount for the event will be differ with facilities requested from the user.

Write a C program to

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

Consider the payment for 1 kg. birthday cake as Rs. 3000.00 and the charges for fire work will be Rs. 2500.00.

ii. Your program should display the total charge for the event to 2 decimal points.

iii. Program should continue the execute until user enter -88 as the package ID

iv. If the user has input invalid package type, terminate the program.

Save your program as 2BQ1.c

Sample output 1

Enter package ID:2
Enter no of guests:3

You have selected package ID: 2
Total charge for the event: 1800.00

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: 12750.00

Enter package ID:8
Invalid package ID

Sample output 2

Enter package ID:1
Enter no of guests:5

You have selected package ID: 1
Total charge for the event: 2500.00

Enter package ID:-88

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 st**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. Lowest mark of the class.
    c. Number of students who obtained marks lower 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
Lowest mark: 35.0
Number of students who obtained marks lower than the average mark: 4
The difference between highest and lowest marks of the students: 55.0

Save your program as 2BQ2A.c

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 form the keyboard and store in the array.
iii) Display the **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 considred.

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 2BQ2B.c

Question 3 (30 Marks)

In the festive season from December 5th till 8th April FashionStar Clothing shop provide discounts for card a, b and c under following rates

Date	Card types	Discount
5	a	20%
6	b	25%
7	a,c	30%
8	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 **payementAmount()** to calculate Total payable amount after deducting discount.
Function prototype is given below
payementAmount(int date, char cardType, double amount)

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

Total Payment	Loyalty card type
> 30 000	Gold
10 000 - 30 000	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 **testpayementAmount()** which contain 3 assert statements to debug the implemented **payementAmount(int date, char cardType, double amount)** function.

iv. In your main function do the following:
   a. Enter the Date, card type and amount (before discount) from the keyboard.
   b. Call function **payementAmount()** ,**displayLoyaltytype()** and **testpayementAmount()** in your main function.

Save your program as 2BQ3.c

Question 4 (20 Marks)

An organization uses a text file to record the details of their employees. For each employee following details will be saved

Employee ID

Employee Name

NIC

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

```
1 Asanka 889067546V
2 Dinesh 763456782V
3 Niroma 904562345V
```

b) Write a C program to

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

Save your program as 2BQ4.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