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STUDENT ID: .....

MACHINE NUMBER: .....

Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Specialized in Information Technology

Final Examination
Year 1, Semester 1 (2022)

IT1010–Introduction to Programming

Session 2- Version A

Duration: 3 Hours

February 2023

Instructions to Candidates:

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

Question 1 **20 Marks**

A Leisure Center known as "GooYo" has three types of Packages (G – Gold, S – Silver, B – Bronze) to select when they are booking a vacation. The following table shows the package type and price of each package.

Package Type	Price Per participant
Gold (G)	Rs. 20,000.00
Silver (S)	Rs. 15,000.00
Bronze (B)	Rs. 10,000.00

If the number of participants for a reservation is more than 10, an additional 10% discount will be given from the above price.

There are several additional items they can reserve, which will be added as a cost to the existing package amount.

Additional Service	Cost
Camping (C)	Rs.5000.00
Yala Visit (V)	Rs. 7500.00
Night event (E)	Rs. 10,000.00

A user can book the required package and if wanted can also select one or few additional services from the above.

Write a C program that takes the **package type, no of participants and whether additional service required or not** as keyboard inputs and calculate and display the total amount to pay for the reservation. If user enters "Y" for the additional services, user should be able to select any number of additional services. Finally, the program should calculate the total amount to pay by adding the package cost and cost of additional services and deducting discount if applicable.

Save your program as **loopsC.c**

Sample Output 1

```
------------------------
Package Type: G
No of Participants: 7
Additional Services: N
Total Amount to be paid: Rs. 140,000.00
```

Sample Output 2

```
-------------------------
Package Type: B
No of Participants: 12
Do you want an additional Services: Y
Enter the service you like to book :C
Do you want an additional Services: Y
Enter the service you like to book :E
Do you want an additional Services: N
Total Amount to be Paid: Rs. 123,000.00
```

Question 2 **30 Marks**

PART A

Write a C program to do the following.

a) Declare a 1D array called **rainfall** of size 7.
b) Input the rainfall of 7 days from the keyboard and store in the array.
c) Read the values stored in the array, calculate and display the average, maximum, minimum rainfall of the values for day 1 to 1, day 1 to 2, day 1 to 3, ...

Example

45.0	60.0					

Input the rainfall of day 1: 45.0

Input the rainfall of day 2: 60.0

.....
.....

Day 1 to 1

Average rainfall : 45.00 mm
Maximum rainfall : 45.0 mm
Minimum rainfall : 45.0 mm

Day 1 to 2

Average rainfall : 52.50mm
Maximum rainfall : 60.0 mm
Minimum rainfall : 45.0 mm

.....
.....

Save your program as **arrayC1.c**

PART B

Symmetric matrix is a square matrix in which elements in either side of the main diagonal are **equal**

e.g.

8	4	1	9
4	2	8	7
1	8	1	3
9	7	3	1

a) Create a two dimensional integer array called **Smatrix** of size 4 x 4 and allow the user to enter values from the keyboard.

User interface should be as follows:

Values for row1
Enter element 1 :
Enter element 2 :
Enter element 3 :
Enter element 4 :
Values for row2
Enter element 1 :
Enter element 2 :
Enter element 3 :
Enter element 4 :
.....
.....

b) Display the contents of **Smatrix** array and check whether it is a symmetric matrix or not and display an appropriate message.

Save your program as **arrayC2.c**

Question 3 **30 Marks**

The fertilizer (Urea, T.S.P , M.O.P) recommendation for paddy cultivation is given in the following table according to the age group of the paddy crops. Write a C program to calculate the fertilizer payment of the farmers for their paddy cultivation.

Age group (Weeks)	Urea (kg for Hectare)	T.S.P (kg for Hectare)	M.O.P (kg for Hectare)
0	0	35	0
2	30	0	0
4	65	0	25
6	50	0	25
7	30	0	0

The prices of the fertilizers are mentioned bellow.

Fertilizer	Price of 1 kg
Urea	68/=
T.S.P	60/=
M.O.P	75/=

a) Write a function called `calcPayment()` to calculate and return the fertilizer payment of a farmer. The age of the paddy crops in weeks and the paddy field size in Hectare are the parameters of the function.

Function prototype is given below.

```
float calcPayment(int age, float size)
```

b) The government has decided to reduce 15% of the payment as a subsidy. Write a function called `calcSubsidy()` to calculate and return the subsidy amount when the calculated payment is passed as parameter.

Function prototype is given below.

```
float calcSubsidy(float payment)
```

c) Write a function called `displayDetails()` to display the payable amount and subsidy amount according to the following format.
(Payable amount = Payment - subsidy amount)

Payable amount Subsidy amount

....

Function prototype is given below.

```
void displayDetails(float payment, float subsidy)
```

d) In your main function,
   i) Write two assert statements to test `calcPayment ()` function.
   ii) Allow the user to enter the age of the paddy crops in weeks and the paddy field size in Hectare from keyboard. Call function `calcPayment()` and `calcSubsidy()` in your main function. Display the payable amount and subsidy amount using `displayDetails()` function. The program should read the details of 3 farmers and perform the calculations.

Display the details according to the following format.

The age of the paddy crops in week : .....
The paddy field size in Hectare : .....

Payable amount Subsidy amount

....

The age of the paddy crops in week : .....

The paddy field size in Hectare : .....

Payable amount Subsidy amount

....

Save your program as **funC.c**

Question 4 **20 Marks**

A "FilmTime" cinema is using a data file called "ticket.dat" to store the details of the movie tickets they sell. Currently, they show 3 movies Harry Portor (H), Frozon – II (F) and Sherlock Homes (S).

Write a C program to input the movie (H/F/S) , ticket type (balcony (B) or normal (N)) and number of tickets of each purchase from the keyboard and write to a data file called "ticket.dat"

The program should allow the user to enter details of 5 purchases.

Sample output

H	B	4
F	B	2
H	N	6
S	N	1
F	B	2

Also generate a summary report as follows using the data stored in the "ticket.dat".

Harry Portor
- Balcony - 4
- Normal - 6

Frozon-II
- Balcony - 4
- Normal - 0

Sherlock Homes
- Balcony - 0
- Normal - 1

Save your program as **fileC.c**

Grading Sheet

Question 1

Compile correctly	1.0
Execute correctly	
- Inputs	1.0
- Outputs	1.5
Correct use of loop	2.0
Correct use of selection	4.0
Take correct inputs	2.0
Perform correct calculation	4.0
Display error message	1.0
Display output	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 - output	2.0
- 2D array - input	1.0
- 2D array - output	2.0
1D array	
- creation	1.0
- insert values	1.0
- functionality implementation	6.0
- Display output	1.0
2D array	
- creation	1.0
- insert values	3.0
- functionality implementation	6.0
- Display output	2.0
Coding conventions	2.0

Question 3

Compile correctly	1.0
Execute correctly	
- Inputs	1.0
- Outputs	2.0
Function implementation	
- calcPayment( )	5.0
- calcSubsidy( )	4.0
- displayDetails( )	4.0
Calling the function with correct arguments	
- calcPayment()	2.0
- calcSubsidy()	2.0
- displayDetails()	2.0
Entering values from keyboard	1.0
Entering multiple records	2.0
Assert statements	2.0
Coding Conventions	2.0

Question 4

Compile correctly	1.0
Execute correctly	
- Write data	1.0
- Outputs	2.0
File write	
- Open file for writing	1.0
- Take inputs 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
- Calculation	3.0
- Handle multiple records	1.0
- Display output	1.0
Coding conventions	2.0