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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 1 – 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 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)

A restaurant offers "Awurudu Sawan" menus for their customers within new year season.

Sawan Type	Description	Price per a Sawan
1	Italian Express Family Pack	10000/=
2	Indian Summer Family Pack	12000/=
3	Special BBQ Family Pack	15000/=

When the customers purchase "Awurudu Sawan", the restaurant charges an additional amount as a service charge or delivery charge depend on the order type. The additional amount is calculated as a percentage from the total amount. (Total amount = Price per a Sawan * No. of Sawan)

Order Type	Description	Service Charge	Delivery Charge
I	Dine in	15%	-
T	Take a way	5%	-
D	Delivery	-	5%

Write a C program that takes order details of the customers within a day.

i. The **Sawan type, no. of Sawans and the order type** should be taken as keyboard inputs.
ii. The program should calculate and display the net amount to be paid by each customer.
iii. And the program should terminate the taking order details, when the total number of orders becomes 5 or if there are no more orders to be taken.
iv. If the user has input invalid Sawan type, display an error message.
v. If the user has input invalid order type, terminate the program.

Save your program as 1BQ1.c

Sample Output 1

Sawan Type: 1
No of Sawans: 5
Order Type: T
The amount to be paid: 52500.00
Do you want to input the next order details: N

Sample Output 2

Sawan Type: 2
No of Sawans: 3
Order Type: D
The amount to be paid: 37800.00
Do you want to input the next order details: Y

Sawan Type: 1
No of Sawans: 1
Order Type: T
The amount to be paid: 10500.00
Do you want to input the next order details: N

Question 2 (30 Marks)

Part A

You are supposed to write a program for a grocery store that needs to keep track of the prices of its products. Write a program that does the following.

i. Create an array called **proPrice** that can store the prices of 10 products.
ii. Read 10 prices from the keyboard and store in the array.
iii. Calculate and display the following
    a. Average price of the products.
    b. Lowest price of the products.
    c. Number of products that cost more than Rs. 100.00
    d. Total cost of all the products that cost more than Rs.200.00

Example input array: {67.00, 130.00, 45.00, 250.00, 15.00, 75.00, 300.00, 550.00, 265.00, 650.00}

Example output:

Average price: Rs. 234.70
Lowest price: Rs.15.00
Number of products more than Rs.100:6
Total cost of products more than Rs.200.00: Rs. 2015.00

Save your program as 1BQ2A.c

Part B

There are two matrices, A and B, with dimensions 2 x 3 and 3 x 3, respectively. You can use 2D arrays to perform the matrix multiplication. The resulting matrix C will have dimensions 2 x 3.

Example

2	3	1
4	2	2

A

6	2	1
3	5	2
1	2	4

B

22	21	12
32	22	12

C

Write a C program to does the following

i) Declare three arrays A, B and C with the above given dimensions.
ii) Read the numbers from the keyboard and store in the two arrays A and B.
iii) Perform the matrix multiplication and store the result array C.
iv) Display the three arrays in tabular format.

Save your program as 1BQ2B.c

Question 3 (30 Marks)

A car rental company is offering discounts on rentals based on the number of days rented. The discount rates are as follows:

Vehicle Type	Rental rate per day	Number of days	Discount
a	4000	1-2	no discount
		3-5	10% discount
		6 days or more	20% discount
b	8000	1-2	no discount
		3-5	10% discount
		6 days or more	20% discount

i. Write a C program to calculate the payable amount after applying the discount for a given number of rental days and vehicle type.

Function prototype:

double payableAmount(char vehicleType, int NumDays)

However, government is imposing a Tax from payable amount after deducting discount as below.

Payable amount	Tax rate
> 15 000	20%
10 000 - 15 000	10%
<10000	5%

ii. Write a function named **paymentAfterTax()** to calculate final payable amount to customer with tax.
double payablewithTax (double payment)

iii. Write a function called **testpaymentAfterTax ()** which contain 3 assert statements to debug the implemented **paymentAfterTax()** function.

iv. In your main function do the following:
   a. Enter vehicle type and number of days from the keyboard.
   b. Call function **payableAmount()** , **paymentAfterTax ()** and **testpaymentAfterTax ()** in your main function.

Save your program as 1BQ3.c

Question 4 (20 Marks)

A vehicle repair center uses a text file to record the details of their items. For each repairing item following details will be saved

Item code

Name

Sample output

```
R81  buffer
R90  wipers
R78  lamps
R67  wheels
```

Write a C program to

i. Input the Item code, Name for 5 items from the keyboard and save the file as "Items.dat".
ii. Read a name and display the item code of that relevant item name.
iii. If Name does not exists, display an error message.

Assume that no duplicate names are in the directory.

Save your program as 1BQ4.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