

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 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)

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

Sawan Type	Description	Price per a Sawan
1	Chinese Express Family Pack	7000/=
2	Indian Summer Family Pack	10000/=
3	Special BBQ Family Pack	12000/=

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	5%	-
T	Take a way	-	-
D	Delivery	-	10%

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

- The **Sawan type, no. of Sawans and the order type** should be taken as keyboard inputs.
- The program should calculate and display the net amount to be paid by each customer.
- 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.
- If the user has input an invalid Sawan type, display an error message.
- If the user has input an invalid order type, terminate the program.

Save your program as 1AQ1.c

### Sample Output 1

Sawan Type: 1

No of Sawans: 5

Order Type: T

The amount to be paid: 35000.00

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: 33000.00

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: 7000.00

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 C program that does the following.

- i. Create an array called **prices** 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. Highest price of the products.
  - c. Number of products that cost less than Rs. 100.00
  - d. Total cost of all the products that cost more than Rs.500.00

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

Highest price: Rs.650.00

Number of products less than Rs.100:4

Total cost of products more than Rs.500.00: Rs. 1200.00

### 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 them in arrays A and B.
- iii. Perform the matrix multiplication and store the result in array C.
- iv. Display the contents of three arrays in tabular format.

Save your program as 1AQ2.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	5000	1-3	no discount
		4-6	10% discount
		7 days or more	20% discount
b	8000	1-3	no discount
		4-6	10% discount
		7 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	10%
10 000 - 15 000	5%
<10000	0%

- ii. Write a function named **paymentAfterTax()** to calculate final payable amount to customer with tax.  
**double paymentAfterTax(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:
- Enter vehicle type and number of days from the keyboard.
  - Call function **PayableAmount()** , **paymentAfterTax ()** and **testpaymentAfterTax ()** in your main function.

Save your program as 1AQ3.c

#### Question 4

(20 Marks)

A computer repair shop uses a text file to record the details of their items. Following details are saved for each repairing item. .

Item code

Name

Sample output

```
I81 motherboard
I90 RAM
I78 monitor
I67 laptop
```

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 1AQ4.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