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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 1- Version B

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 7 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 **30 Marks**

An Internet service provider has announced newly revised charges for their internet packages. Write a C program to calculate the monthly bill payment of the customers.

Type of packages available and their details are given below.

Package Type	Data Bundle (GB)	Monthly Subscription Fee (Rs)	Excess Usage Charge
1	1.5	120	2 Rupees / MB
2	5	350	1.5 Rupees / MB
3	10	660	1 Rupee / MB
4	20	1200	0.5 Rupees / MB

i) Write a function called `calcPayment()` to calculate and return the payment of a customer. The package type and total data usage in GB are the parameters of the function.

(Payment = Excess Usage Charge + Monthly Subscription Fee
Excess data usage = total data usage - Data Bundle
01 GB = 1024 MB)

Function prototype is given below.

```
float calcPayment(int pType, float totalData)
```

ii) The company has decided to include a 5% tax on the payment. Write a function called calcTax() to calculate and return the tax for the payment when the calculated payment is passed as parameter.

Function prototype is given below.

```
float calcTax(float payment)
```

iii) Write a function called displayDetails() to display the payment, tax amount and the monthly bill payment according to the following format.
(Monthly bill payment = Payment + Tax amount)

Payment ..... Tax amount ..... Monthly bill payment .....

Function prototype is given below.

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

iv) In your main function,
   a) Write two assert statements to test calcPayment () function.
   b) Allow the user to enter package type and total data usage in GB from keyboard. Call function calcPayment() and calcTax() in your main function. Display the payment, tax amount and monthly bill payment using displayDetails( ) function. Allow the user to input the package type and total data usage of 3 customers.

   Display the details according to the following format.

   Package Type : .....
   Total data usage : .....

Payment	Tax amount	Monthly bill payment
.....	.....	.....

Save your program as **funB.c**

Question 2 **20 Marks**

A company is planning to give bonus for their employees during the new year season. The bonus amount is calculated based on the category of the employee. The criteria for the bonus calculation is given in the following table.

Employee Category	**Description**	**Criteria**
1	Performance based bonus	A number between 1- 3 times the basic salary
2	Temporary staff	Number of working days more than 240 gets daily payment * 20 times
3	On contract	Fixed amount of 50,000 rupees

Write a C program to input the employee category and the other details (eg: basic salary, number of working days, daily payment, …) based on the category of employee and calculate the bonus amount given to each employee.

After calculating the bonus for one employee, the program should prompt a message "Do you want to continue?". If the user inputs "y" or "Y", the program should ask the user to enter the details of the next employee. If the user input "n" or "N" the program should terminate.

Format your output to 2 decimal places.

Save your program as **loopsB.c**

Question 3 **30 Marks**

PART A

Write a C program to do the following.

a) Declare a 1D array called **strArr** of size 15.
b) Input a text from the keyboard and store in the array.
c) Reverse and store the elements of the array **without using an additional array**.
d) Display the array elements.

Hint: swap first and the last element, second and one before the last, etc…

Example

Original Array

L	O	V	E	P	R	O	G	R	A	M	M	I	N	G

Reversed Array

G	N	I	M	M	A	R	G	O	R	P	E	V	O	L

Save your program as **arrayB1.c**

PART B

Write a C program to do the following

a) Declare a 2D array called **salesArr** with 2 rows and 3 columns. Here the rows represent the salesperson and column represent the products.
b) Input the sales amount of 2 salesperson for 3 products and store in the array.
c) Display the sales amount in the tabular format representing salesperson as rows and product as columns.
d) Find the index of the salesperson with the highest total sales amount.

Save your program as **arrayB2.c**

Sample program output

```
Enter the sales amount of sales person 1.
                Product 1: 2000.00
                Product 2: 4500.00
                Product 3: 1200.00
Enter the sales amount of sales person 2.
                Product 1: 3500.00
                Product 2: 2100.00
                Product 3: 2300.00

The sales amount of 2 sales person for 3 products.

2000.00     4500.00     1200.00
3500.00     2100.00     2300.00

The sales person with the highest sales amount is sales person 1
```

Question 4 **20 Marks**

A pizza shop makes three different types of pizzas (veggie, chicken, seafood) of two sizes (regular, large). The shop maintains a data file to record their sales details (transaction ID, type of pizza, size, and number of pizzas).

Write a C program to input the type of pizza (V/C/S), size (R/L) and number of pizzas from the keyboard and write to a data file called "outletOrders.dat". The transaction ID should be generated by the system starting from 100. The program should allow the user to enter details of any number of orders, until user enters -99.

Sample output

100	V	R	2
101	C	L	3
102	V	L	1
103	S	R	4
104	V	R	1
105	C	L	2

At the end of the day, generate a summary as follows using the data stored in the "outletOrders.dat".

Veggie Pizza
- Regular - 3
- Large - 1

Chicken Pizza
- Regular - 0
- Large - 5

Seafood Pizza
- Regular - 4
- Large - 0

Save your program as fileB.c

Grading Sheet

Question 1

Compile correctly	1.0
Execute correctly	
- Inputs	1.0
- Outputs	2.0
Function implementation	
- calcPayment()	5.0
- calcTax()	3.0
- displayDetails()	4.0
Calling the function with correct arguments	
- calcPayment()	2.0
- calcTax()	2.0
- displayDetails()	2.0
Entering values from keyboard	1.0
Entering multiple records	3.0
Assert statements	2.0
Coding Conventions	2.0

Question 2

Compile correctly	1.0
Execute correctly	
- Inputs	1.0
- Outputs	1.5
Correct use of loop	3.0
Correct use of selection	3.0
Take correct inputs	3.0
Perform correct calculation	3.0
Display error message	1.0
Display output	1.0
Formatting the output	0.5
Coding conventions	2.0

Question 3

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 arrays	1.0
2D array	
- creation	1.0
- insert values	3.0
- functionality implementation	6.0
- Display array	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