

Web Programming - IT206071 - Written Assignment 01

Consider the following scenarios and answer the questions according to the following.

- A) Pseudo Code
- B) Flow Chart
- C) Enough Test Data for Test the flow chart.
- D) Any assumptions you have make

01) Calculate BMI (Body Mass Index).

$$\text{BMI} = \text{weight (kg)} / [\text{height (m)}]^2$$

02) Consider the electronic item selling shop. Preparing the final bill they will read the item code, description, unit price and quantity of product. Then calculate the total amount of product. Then add 12% VAT value to the product amount. Then add 2% NBT value to the product amount. (including VAT value). Then calculate the net amount of the product. Then print the bill (invoice).

03) Consider the government officer salary calculation and perform it. Consider the following information: basic salary and wedges defined by the institute. All other additions and deductions based on basic salary. 55% monthly allowances, cost of living allowance LKR 12800.00, overtime allowance based on number of hours worked for overtime. You can consider the officer to work at least 20 days a month and 8 hours per day. Hourly overtime rate is 1.5 times of a normal day. Basic deductions are loan amount, EPF (8%), TAX (12%).

04) Consider the water bill calculation. Water bill calculation one time for each month. Moth start reading and month end reading of meter reading need to calculate the number of units consumed for the given month. Unit price of water is LKR 32.00. To finalize the water bill, we need to add a LKR 480.00 fixed charge and 10% of service charge and 12% of VAT and 2% of NBT.

05) Consider the life insurance sales agent commission calculation. That totally depends on the amount of premium collected by him. Amount of premiums 3 types. First year premiums, second year premium and third year premium. Agent sales commission based on given commission rate according to the year. First year premium can gain 30% commission, second year premium can gain 20% commission and third year premium can gain 15% commission. According to the condition calculate the sales agent monthly commission.

06) Consider a triangle. Check if any given 3 length satisfies the triangle or not.

07) Consider the quadratic equation and solution of it.

08) Consider the electricity bill calculation. Read start and end meter readings and calculate the monthly Electricity bill as according to the following rate chart.

A. Each range should charge as follows

Unit Range	Charge per Unit (Rs.)
0 - 30	8.00
31 - 80	12.00
81 - 120	20.00
121 - 150	32.00
151 - 200	56.00
200 and above	60.00

B. Add 15% service tax to the total bill.

C. Add Rs 150 fixed amount if the electricity supply method two phase and if it is three phase add Rs 400

D. In addition, add the following usage tax to the bill according to the following table.

Usage Type	Tax Percentage (%) From Total Bill
Personal	0
Industry	30
Government	20

09) Consider the saving account interest calculation. Find the account balance within the 1 year time period for any given initial account balance. Yearly interest rate for saving account is 4.75%

10) Consider the finding maximum number between any given two numbers.

11) Consider the finding minimum number between any given three numbers.

12) Consider the finding leap years from any given year.

Leap Year Test



13) Consider a newspaper advertisement collecting agency. The charges for the advertisement depend on the number of words in the advertisement. The number of words and relevant charges are given in the following table. Write a program to calculate the paper advertisement charges.

Number of words	Charge Per Word (Rs.)
Up to 20	30.00
20 and above but less than 40	27.00
40 and above but less than 60	25.00
60 and above but less than 80	20.00
80 and above but less than 100	17.00
100 and above words	15.00

14) Consider the A/L student grade calculation. Grade will assign using the following table

Average Marks (x)	Grade
$75 \leq x \leq 100$	A
$65 \leq x < 75$	B
$50 \leq x < 65$	C
$35 \leq x < 50$	S
$0 \leq x < 35$	F

15) Consider the university student GPA (Gross Point Average) calculation according to your university. Provide a better efficient solution for it.

16) Consider the following table data to calculate the standard deviation of any given range data.

Range	Frequency (n_i)	Midpoint (m_i)	$m_i * n_i$	μ	$m_i - \mu$	$(m_i - \mu)^2$	$n_i(m_i - \mu)^2$
1-10	2	5.5	11	22.89	-17.39	302.41	604.82
11-20	7	15.5	108.5	22.89	-7.39	54.61	382.28
21-30	10	25.5	255	22.89	2.61	6.81	68.12
31-40	3	35.5	106.5	22.89	12.61	159.01	477.04
41-50	1	45.5	45.5	22.89	22.61	511.21	511.21

$$\text{Standard Deviation} = \sqrt{((604.82 + 382.28 + 68.12 + 477.04 + 511.21) / 22)} = \mathbf{9.6377}$$

17) Consider the ATM (Automated Teller Machine). It needs to calculate the minimum number of notes needed to withdraw the any amount given by the customer.

18) Calculate the number of milliseconds passed by from the start that day for any given time.

19) Find the maximum number of days in the given month.

20) Calculate the number of days passed by from 1970-01-01 from the given date.

21) Consider swapping two integers using functions.

22) Consider the calculation of the factorial value of any given integer.

23) Consider doing the following tasks.

- I. Take unit price and quantity from the user using appropriate variables.
- II. Calculate the total amount that the user should pay.
- III. Customer will receive a 10% discount if the total amount is greater than Rs. 1000.00
- IV. Calculate the net amount that users have to pay.
- V. Print the bill as follows.

ABC Shop			
Unit price	: Rs.	1500.00	
Quantity	:	4	
Total	: Rs.	6000.00	
Discount	: Rs.	600.00	
Net Amount	: Rs.	5400.00	

VI. Use separate functions for part II, III ,IV and V..

24) Consider the standard calculator calculations and perform each calculation by function.

25) Consider the given number prime or not using functions.

26) Consider the definition of $nCr = \frac{n!}{(r!(n-r)!}$. $n!$ And $r!$ is factorial of n and r .

27) Consider finding minimum & maximum in three numbers by Function.

28) Due to the Covid-19 pandemic, the University has decided to reduce the number of students coming to the University premises. As per the decision, a particular student can come only on a single day in a week. That day is determined by a calculation performed using their University registration number. The calculation is as follows:

The remainder is taken when the “University registration number” of a student is divided by five (5). The day to come to university is decided as given below based on the remainder value.

Remainder	Day
0	Monday
1	Tuesday
2	Wednesday
3	Thursday
4	Friday

Write a user defined C function to show the allocated day for a student to come to university when registration number is supplied.

29) Consider the CDM/ATM machine functionality supplied by banks. Perform each functionalities by functions.

30) Consider the finding Z-Score of A/L subjects.

31) Consider the calculating distance between two points in the 2D cartesian system.

32) Consider the calculating distance between two geo locations in a polar coordinate system.

33) Consider taxi healing apps that provide cost estimation.

- 34) Consider downloading apps and calculating the remaining time.
- 35) Consider file copying apps and calculating the remaining time.
- 36) Consider the vehicle service station and how to calculate the service charge of them.
- 37) Consider the time table in the hall and human allocations for lectures.
- 38) Consider the trip manager application which provides the most economical and efficient route.
- 39) Consider the call center agent allocation efficiently to the incoming calls.
- 40) You have been assigned to develop the web application for “**University Academics Employee Salary Calculation**”. Salary calculation based on post and academics allowances allowed by the UGC. Following table shows the details of post and allowances rate given based on basic salary. [Mid Semester 2024]

Post	Basic Salary	Academic Allowance rate after 2024/03
Lecturer (Probationary)	67,950.00	144%
Lecturer	77,730.00	164%
Senior Lecturer II	97,290.00	189%
Senior Lecturer I	106,500.00	189%
Associate Professor	121,350.00	196%
Professor	152,450.00	203%
Senior Professor	171,350.00	209%

- 41) Proposed prototype of "**Customized Papaya Juice Making Machine**" going to be implemented in your company.

Customized Papaya Juice Making Machine

This machine allowed customers to prepare the papaya juice with their preferences. Under these preferences users can change the cold water volume 250ml to 500ml, papaya weight 50g to 100g, number of sugar spoons 2 to 6. Price of customized papaya juice will be Rs 150.00 fix charge for cold water, Rs 1.00 for papaya 1g and Rs 5.00 per sugar spoon.

Machine will issue the detailed bill for customized papaya juice preparation.

[Mid Semester 2024]

- 42) Proposed prototype of "**Customized Tea Making Machine**" going to be implemented in your company.

Customized Tea Making Machine

This machine allowed customers to prepare the tea with their preferences. Under these preferences users can change the hot water volume 125ml to 375 ml, tea leaves weight 1g to 3g, number of sugar spoons 1 to 3. Price of customized tea will be Rs 50.00 fix charge for hot water, Rs 2.50 for tea leaves 1g and Rs 5.00 per sugar spoon. Machine will issue the detailed bill for customized tea preparation.

[Mid Semester 2024]