Subject: PRF192- PFC
Workshop 02

Objectives:
   Practicing skills at analyzing and implementing simple programs

Program 1 (2 marks)

Write a program that let user input an integer. Please identify if this integer is the even number and it is divisible by 3. The result is printed out to the monitor as YES if it is satisfied and NO if it does not satisfy problem requirement.
An example: 18 shows YES but 15 shows NO.

Sample Analysis

	Content	Implementation
Nouns	Expression, format num result	integer num
Verbs	Begin Accept num, even, reminder **Calculate division with reminder result** Print out result End	scanf("%d", &num) even = num % 2 reminder = num % 3 if (even is true and reminder is zero) print out The integer NUM is YES else print out The integer NUM is NO }

Implement this program.

Program 2 (2 marks)

Write a program that allows user inputting a simple expression containing one of four operators +, -, *, / then the result is printed out to the monitor. Input format: num1 operator num2,
An example of user interface
Enter an expression (+ - * /): 4*5
Result: 20

Sample Analysis

	Content	Implementation
Nouns	Expression,	double num1, num2 char op

	format num1 operator num2	double result
	result	

Verbs	Begin
	Accept num1, op, num2
	Calculate result
	Print out result
	End
		scanf("%lf%c%lf", &num1, &op, &num2)
		switch (op)
		    { case '+' : result = num1 + num2;
		          print out result;
		          break;
		     case '-' : result = num1 - num2;
		          print out result;
		          break;
		     case '*' : result = num1 * num2;
		          print out result;
		          break;
		    case '/' : if (num2==0)
		          print out "Divide by 0 "
		          else
		          { result = num1 / num2;
		            print out result;
		          }
		          break;
		     default: print out "Op is not supported"
		          }

Implement this program.

Program 3 (2 marks) – Yearly Personal Income Tax

Suppose that:
In Viet Nam, each people has to pay for his/her yearly personal income tax as the following description:

Rules:

Tax-free income:
   Personal pending amount (tiền nuôi bản thân) **pa=** 11 000 000 VND/month
   Alimony (tiền cấp dưỡng) for each his/her dependent **pd=** 4 400 000 VND /month/dependent
  With **n** dependents, Yearly tax-free income: **tf = 12*(pa + n*pd)**

Taxable income (thu nhập chịu thuế)

ti = income – tf
(If ti<=0 then income tax = 0)

Based on taxable income, the employee has to pay his/her income tax with levels pre-defined in the following table:

Level	Taxable Income Annually	Rate tax
1	Less than or equal to 60.000.000	5%
2	From 60.000.000 to 120.000.000	10%
3	From 120.000.000 to 216.000.000	15%
4	Over 216.000.000	20%

Write a program which will compute income tax of a people using the following interface:

Case 1:

Your income of this year: 320000000
Number of dependent: 4
Tax-free income: 343200000
Taxable income: 0
Income tax: 0

Case 2:

Your income of this year: 440000000
Number of dependent: 4
Tax-free income: 343200000
Taxable income: 96800000
Income tax: 6680000

Program 4 (1 mark)

Objectives	Practice loop statements
Related knowledge	None
Problem	Write a C program that will print out **sum** of **integers** inputted from the keyboard until the value 0 is inputted.

Analysis
Nouns: sum → int S;
	Suggested algorithm (logical order of verbs)
	Begin
	    S=0;
	    Do {

Accepted
integral value → int x
	Accept x;
	If (x != 0) S = S + x;
	}
	While (x!=0);
	Print out S;
	End

Program 5 (1 mark)

Objectives	Practice loops statement
Related knowledge	None
Problem	Write a C program that will carry out some times: accept two integers, swap these values, print them out to the monitor. The program will terminate when the value of 0 is inputted.

Analysis
Nouns:
2 integers → int x, y;
	Suggested algorithm (logical order of verbs)
	Begin
	    Do {
	        Accept x, y;
	        int t= x; /* t: temporary variable */
	        x= y;
	        y= t;
	        Print out x, y;
	    }
	    While (x!=0 && y!=0);
	End

Program 6: (2 marks)

Using loop syntax to make a prgram for problem of <u>Yearly Personal Income Tax</u> above applied to many household in Hanoi Capital City. Input the number of household need to calculate the income tax, input details of its family and print out their income tax payment yearly. The program stop if the input of the number of household is 0 number.