Question 1:

Objectives of lab 2: implement arithmetic and boolean expressions. In class, we have not discussed selections: if () {} else {}

For full lab mark, you only need to complete problems 1 to 4. The last two problems are only practice problems.

Problem 1:

Obtain from the user an integer value n and calculate the following quantity:

$$F = \frac{1}{\sqrt{5}}\left(\left(\frac{1+\sqrt{5}}{2}\right)^n - \left(\frac{1-\sqrt{5}}{2}\right)^n\right)$$

Output the numerical value of F

Answer:

```
#include <stdio.h>
#include <math.h>
#include <iostream>
using namespace std;

int main()
{
    int n;
    float F;

    cout << "enter value of n";
    cin >> n;

    F = (1/sqrt(5)) * (pow(1 + sqrt (5)/(2),n)) - (pow(1- sqrt(5)/(2),n));
    cout << "value of F is" << F;

    return 0;
}
```

Question 2:

Calculate and output the value

$$F = \frac{1+2x}{1+x+x^2}$$

, with x, as an input to get from the user.

Answer:

```
#include <stdio.h>
#include <math.h>
#include <iostream>
using namespace std;

int main()
{
    float x;
    float F;
    float a;
    float b;



    cout << "enter value of x";
    cin >> x;
    a = (1 + (2*x));
    b = (1 + x + pow (x,2));

    F = a / b ;
    cout << "value of F is" << F;

    return 0;
}
```

Question 3:

Write a program that gets n, a number of cents and that decomposes n cents into quarters (25 cents), dimes (10 cents), nickels (5 cents), and pennies (1 cent).

Examples :

n = 137

137 cents can be divided into 5 quarters, 1 dime, and 2 pennies.

n = 217

217 cents can be divided into 8 quarters, 1 dime, 1 nickel and 2 pennies.

Answer:

```
#include <stdio.h>
#include <math.h>
#include <iostream>
using namespace std;
int main()
{
    int cent;
    int quarter;
    int dimes;
    int nickels;
    int pennies;
    int remainder;
   cout << "enter the number of cents ";
    cin >> cent;
   quarter = cent/25;
    remainder = cent % 25;
    dimes = remainder/10;
    remainder = remainder % 10;
    nickels = remainder / 5;
    remainder = remainder % 5;
    pennies = remainder;
    cout << "number of quarters "<<quarter<<endl;
    cout << "number of dimes "<< dimes<<endl;
    cout << "number of pennies " << pennies<< endl;
   return 0;}
```

Question 4:

Write a program that gets the input n (int type) and that outputs the following boolean variables:

a = ... is true only when n is divisible by 5.

b = ... is true only when n is a number in the interval [10, 100). Variable n can be equal to 10, but cannot be equal to 100.

c = ... is true only when n is divisible by 5 and is not in the interval [10, 100).

d = ... is true only when n is divisible by 3, but not by 5.

Answer:

```
#include <stdio.h>
#include <math.h>
#include <iostream>
using namespace std;

int main()
{
    int n;
    bool a , b , c , d;

    cout << " inter value of n";
    cin >> n;

    a = (n%5 == 0);
    b = (n>=10 && n<100);
    c = (n%5 == 0 && ! b);
    d = (n%3 == 0 != 0);

    cout<< "a is "<< a<<endl;
    cout<< "b is "<< b<<endl;
    cout<< "c is "<< c<<endl;
    cout<< "d is "<< d<<endl;

    return 0;
}
```