Problem 1:

```
function c = divided_diff(x, y)
    n = length(x);
    F = [ y; zeros(n-1,n)]';
    for i=2:n
        for j=2:i
            num = F(i, j-1) - F(i-1, j-1);
            den = x(i) - x(i-j+1);
            F(i, j) = num/den;
        end
    end
    for i = 1:n
        c(i) = F(i,i);
    end
end
```

```
>> xA = [-0.1, 0.0, 0.2, 0.3];
>> yA = [5.3, 2.0, 3.19, 1];
>> divided_diff(xA, yA)

ans =

    5.3000  -33.0000  129.8333 -556.6667

>> xB = [-0.1, 0.0, 0.2, 0.3, 0.35];
>> yB = [5.3, 2.0, 3.19, 1.00, 0.97260];
>> divided_diff(xB, yB)

ans =
```

```
   1.0e+03 *

    0.0053   -0.0330    0.1298   -0.5567    2.7302
```

Problem 2:

```
>> ALG034
This is the natural cubic spline interpolation.
Choice of input method:
1. Input entry by entry from keyboard
2. Input data from a text file
3. Generate data using a function F with nodes entered from keyboard
4. Generate data using a function F with nodes from a text file
Choose 1, 2, 3, or 4 please
 1
Input n
 2
Input X(0) and F(X(0)) on separate lines.
 1
 2
Input X(1) and F(X(1)) on separate lines.
 2
 3
Input X(2) and F(X(2)) on separate lines.
 3
 5
Select output destination
1. Screen
2. Text file
Enter 1 or 2
```

NATURAL CUBIC SPLINE INTERPOLATION

The numbers X(0), ..., X(N) are:

1.00000000 2.00000000 3.00000000

The coefficients of the spline on the subintervals are:

for I = 0, ..., N-1

A(I)	B(I)	C(I)	D(I)
2.00000000	0.75000000	0.00000000	0.25000000
3.00000000	1.50000000	0.75000000	-0.25000000