

```
...  
...  
i = 1;  
do{  
    cout << "Enter a number from 1 - 20: ";  
    cin >> num;  
}while(num < 1 || num > 20);  
...  
...  
do{  
    cout << "i = " << i << "\n";  
    i++;  
}while(i <= num;  
...
```

Computer Programming For Information System

C++

214106

04

CONTROLS

Controls

■ What is a Control?

- Statement used to enable some instructions to be executed repeatedly until some logical condition has been satisfied.

- Branching:

- if - else
- switch

- Looping:

- for
- while
- do - while

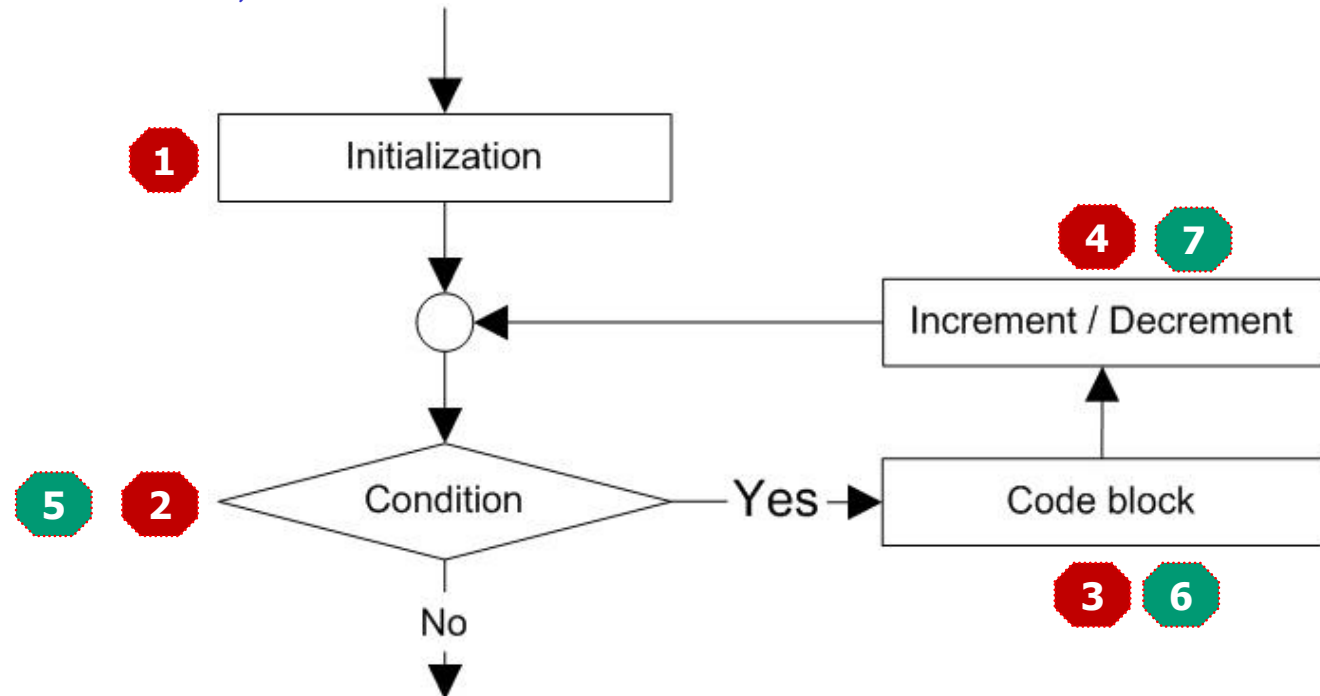
```
if(x < y) {  
    x++;  
    cout << "Result = " << x;  
} else {  
    y++;  
    cout << "Result = " << y;  
}  
...  
y = 7;  
for(x=5; x < y; x++) {  
    cout << "X = " << x;  
}  
  
cout << "Bye!";
```

Controls (for loop)

■ Looping: for

- General form of *for* statement::

```
1for(2initializations53;4 condition76;4 increments/decrements) {  
    statement;  
    statement;  
}
```



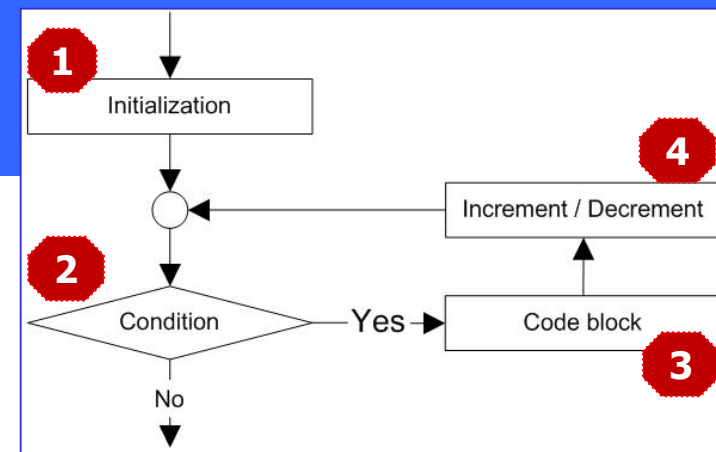
Controls (for loop)

■ Looping: for (cont.)

■ Example:

```
...  
int i;  
  
for(i = 1; i <= 2; i++)  
{  
    cout << i << endl;  
}
```

Answer:



```
1      2      4  
for(initializations; condition; increments/decrements) {  
    statement;  
    statement; 3  
}
```

Controls (for loop)

■ Looping: for (cont.)

■ Example:

```
...  
int i, sum=0;  
  
for (i = 1; i < 3; i++)  
{  
    sum += i;  
}  
  
cout << sum;
```

Answer:

Problem 1

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

int main() {

    for(i=0; i < len; i++){

        cout << "id: " << i << endl;

    }

    return 0;
}
```

Start >> i = 0

Stop >> i = 3 (i < 4)

Step +1

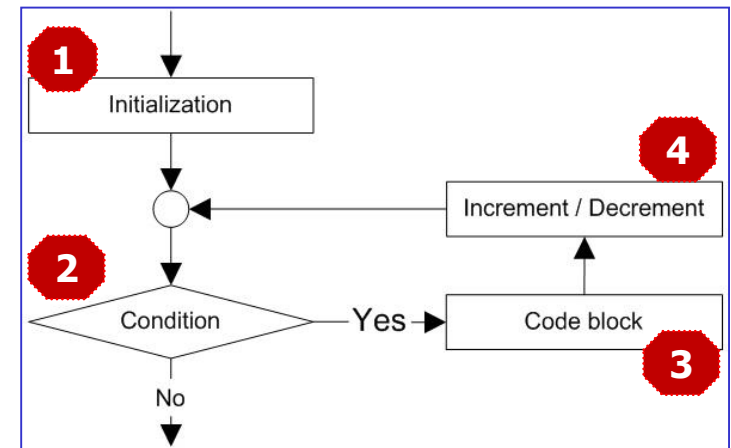
Answer

id: 0

id: 1

id: 2

id: 3



Problem 2

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

int main() {

    int len=4,i;

    for(i=2; i <= len; i++){

        cout << "id: " << i << endl;

    }

    return 0;

}
```

Start >> i = 2

Stop >> i = 4 (i <= 4)

Step +1

Answer

id: 2

id: 3

id: 4

Problem 3

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

int main() {

    int len=4,i;

    for(i=1; i < len-1; i++){
        cout << "id: " << i << endl;
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 4

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

int main() {

    int len=7,i;

    for(i=0; i < len; i+=2){
        cout << "id: " << i << endl;
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 5

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

int main() {

    int len=7,i;

    for(i=0; i < len; i=i+3){
        cout << "id: " << i << endl;
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 6

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

int main() {

    int len=7,i;

    for(i=2; i < len; i++){
        cout << "i = " << i;
        if (i%2 == 1) {
            cout << "..Odd";
        }
        cout << endl;
    }
    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 7

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

int main() {

    int len=7,i;

    for (i = 0; i <= 60; i=i+5)
    {
        cout << i << ", ";
        if ((i % 20) == 0)
            cout << "\n";
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 8

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

int main() {

    int len=7,i;

    for (i = 30; i < 60; i+=5)
    {
        cout << i << ", ";
        if ((i % 15) == 0)
            cout << "\n";
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 9

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

int main() {

    int len=4,i;

    for(i=len-1; i >= 0; i--){
        cout << "id: " << i << endl;
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 10

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

int main() {

    int len=5,i;

    for(i=len-1; i > 2; i--){
        cout << "id: " << i << endl;
    }

    return 0;
}
```

Start >>

Stop >>

Step

Answer

Problem 11

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

int main() {

    int len=6,i;

    for(i=len; i > 1; i--){

        if (i < 3)

            cout << "id: " << i << endl;

    }

    return 0;

}
```

Start >>

Stop >>

Step

Loop

i = 6

i = 5

i = 4

i = 3

i = 2

Answer

Problem 12

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

int main() {

    int len=20,i;

    for(i=len; i > 2; i-=4){

        if (i%3 == 0)

            cout << "id: " << i << endl;

    }

    return 0;

}
```

Start >>

Stop >>

Step

Loop

i = 20

i = 16

i = 12

i = 8

i = 4

Answer

Controls (for loop)

■ Looping: for

■ General form of *for* statement::

```

      1                2 12                11
for(initializations; condition; increments/decrements) {
      3 13                4 7 10 14                6 9 16
  for(initializations; condition; increments/decrements) {
    statement;
    statement
  }
}
```

```
for(i=0; i < 3; i++){
    cout << "i = " << i << endl;
    for(j=0; j < 2; j++){
        cout << "j: " << j << endl;
    }
}
```

i = 0	j = 0
	j = 1
i = 1	j = 0
	j = 1
i = 2	j = 0
	j = 1

Problem 13

```
1.  ...
2.  int main() {
3.      int i, j;
4.      int score;
5.
6.      cout << "Input elements in the matrix:" << endl;
7.      for ( i = 0; i < 2; i++ ) {
8.          for ( j = 0; j < 4; j++ ) {
9.              cout << "scores[" << i << "][" << j << "]: ";
10.             cin >> score;
11.         }
12.     }
13.
14.     return 0;
15. }
```

Input elements in the matrix:

scores[0][0]: 8	i = 0	j = 0
scores[0][1]: 7		j = 1
scores[0][2]: 6		j = 2
scores[0][3]: 5		j = 3
scores[1][0]: 1	i = 1	j = 0
scores[1][1]: 2		j = 1
scores[1][2]: 3		j = 2
scores[1][3]: 4		j = 3

Final score = 4

Problem 14

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

int main() {

    int i, j, k;
    float score, total=0;

    cout << "Input elements:" << endl;
    for (i = 0; i < 2; i++) {
        for (j = 0; j < 2; j++) {
            for (k = 0; k < 3; k++) {
                cout << "scores[" << i << "][" << j << "][" << k << "]: ";
                cin >> score;
                total += score;
            }
        }
    }
    cout << "total score = " << total;
    return 0;
}
```

i = 0	j = 0	k = 0
		k = 1
		k = 2
	j = 1	k = 0
		k = 1
		k = 2
i = 1	j = 0	k = 0
		k = 1
		k = 2
	j = 1	k = 0
		k = 1
		k = 2

```
Input elements:
scores[0][0][0]: 1
scores[0][0][1]: 2
scores[0][0][2]: 3
scores[0][1][0]: 4
scores[0][1][1]: 5
scores[0][1][2]: 6
scores[1][0][0]: 7
scores[1][0][1]: 8
scores[1][0][2]: 9
scores[1][1][0]: 10
scores[1][1][1]: 11
scores[1][1][2]: 12
```

Total score = 78

Problem 15

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

int main() {

    int i, j;
    float total=0;

    for (i = 0; i < 2; i++) {
        for (j = 1; j < 4; j++) {
            total += j;
        }
    }
    cout << "total score = " << total;
    return 0;
}
```

Answer

Total = 12

Start >> i = 0
Stop >> i = 1 (i < 2)
Step +1

Start >> j = 1
Stop >> j = 3 (j < 4)
Step +1

i = 0

j = 1

j = 2

j = 3

i = 1

j = 1

j = 2

j = 3

total = total + j

total = 0+1 = 1

total = 1+2 = 3

total = 3+3 = 6

total = 6+1 = 7

total = 7+2 = 9

total = 9+3 = 12

Problem 16

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

int main() {

    int i, j;
    float total=0;

    for(i=4; i>=1; i--){
        for(j=1; j<=3; j++){
            cout << '#';
        }
        cout << endl;
    }

    return 0;
}
```

Start >> i = 4
Stop >> i = 1 (i >= 1)
Step -1

Start >> j = 1
Stop >> j = 3 (j <= 3)
Step +1

Answer

###

i = 4

j = 1

j = 2

j = 3

i = 3

j = 1

j = 2

j = 3

i = 2

j = 1

j = 2

j = 3

i = 1

j = 1

j = 2

j = 3

Problem 17

.....

```
int main() {  
  
    int row, col, i, j;  
    float total=0;  
  
    cout << "Row: ";  
    cin >> row;  
  
    cout << "Column: ";  
    cin >> col;  
  
    for(i=row; i>=1; i--){  
        for(j=1; j<=col; j++){  
            cout << '#';  
        }  
        cout << endl;  
    }  
  
    return 0;  
}
```

Start >> i = 4
Stop >> i = 1 (i >= 1)
Step -1

Start >> j = 1
Stop >> j = 3 (j <= 3)
Step +1

Row: 4
Column: 3

Answer

###

i = 4

j = 1

j = 2

j = 3

i = 3

j = 1

j = 2

j = 3

i = 2

j = 1

j = 2

j = 3

i = 1

j = 1

j = 2

j = 3

Problem 18

.....

```
int main() {  
  
    int row, col, i, j;  
    float total=0;  
  
    cout << "Row: ";  
    cin >> row;  
  
    for(i=row; i>=1; i--){  
        for(j=1; j<=i; j++){  
            cout << '#';  
        }  
        cout << endl;  
    }  
  
    return 0;  
}
```

Start >> i = 4
Stop >> i = 1 (i >= 1)
Step -1

Start >> j = 1
Stop >> j = 4 (j <= 4)
Step +1

i = 4

j = 1

j = 2

j = 3

j = 4

Row: 4

Answer

####

###

##

#

i = 3

j = 1

j = 2

j = 3

i = 2

j = 1

j = 2

i = 1

j = 1


```
...
...
i = 1;
do{
    cout << "Enter a number from 1 - 20: ";
    cin >> num;
}while(num < 1 || num > 20);
...
...
do{
    cout << "i = " << i << "\n", i;
    i++;
}while(i <= num;
...

```

214106

C++

04 CONTROLS (for loop)