Lecture (6)
" Programming Essentials in C++ “ Revision

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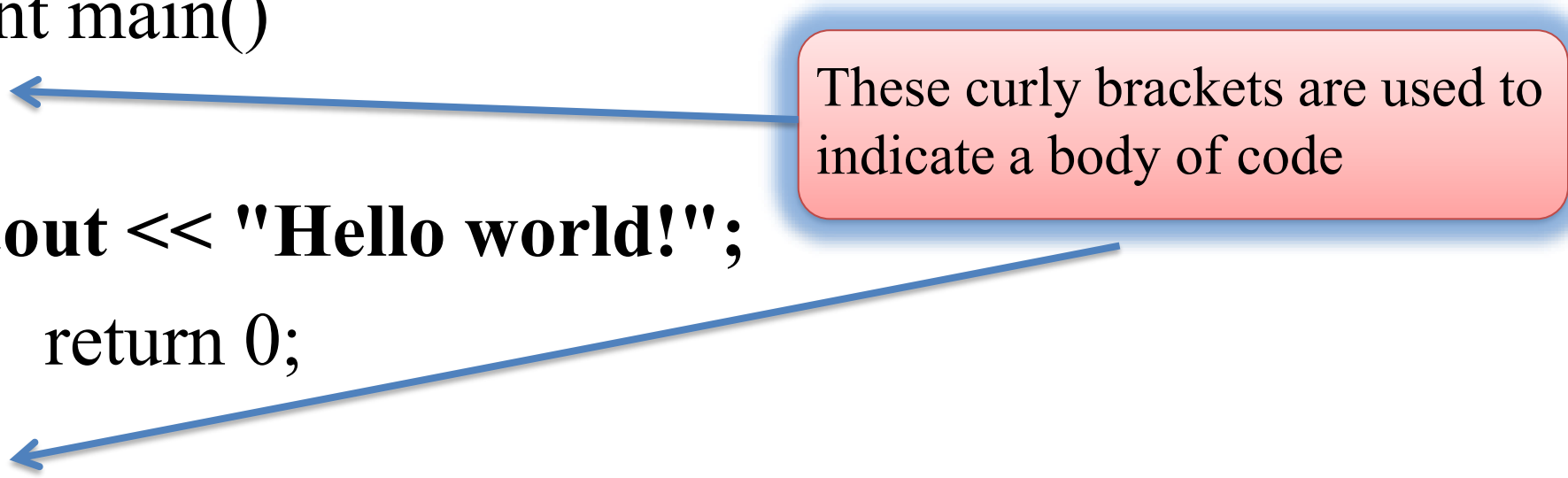
A simple C++ Program

```
// Online C++ compiler to run C++ program
1)  #include <iostream>
2)  using namespace std;
•   int main()
•   {
•   cout << "Hello world!";
•       return 0;
•   }
```



Variables

1	**int**	**Integer variables represent integer numbers**
2	**Double**	Store fractional numbers up to 14 numbers after the point.
4	**Float**	Store fractional numbers up to 7 numbers after the point.
3	**String**	Store text
5	**char**	Used for characters: letters, digits, and special symbols.
6	**bool**	Has two values (true) and (false).

Demand information from the user in C++ Program

```
#include <iostream>
using namespace std;
int main()
{
int x;
Cin >> x<<endl;
Cout<<“x is equal << x<<endl;
 return 0;
}
```

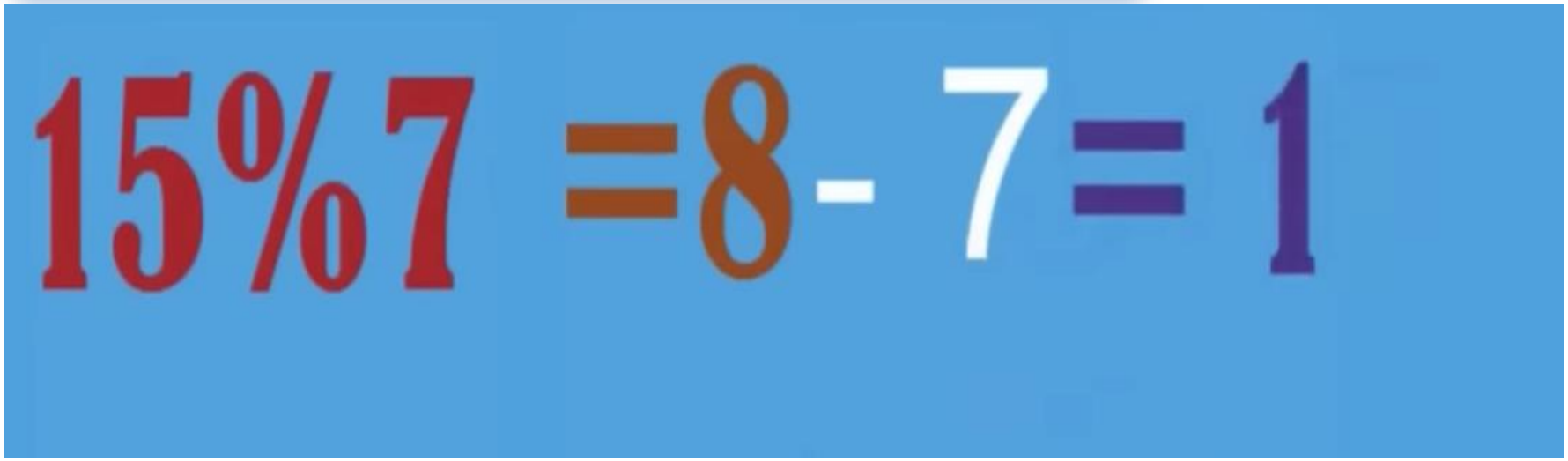
```
8  ********************************************************************
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15     int x;
16     cin>>x;
17     cout<<"x is equal "<<x<<endl;
18     return 0;
19 }
```

```
300
x is equal 300
```

Arithmetic Operations

Symbol	Purpose
+ or -	Addition or Subtraction
-	Negative sign
* or /	Multiplication or Division
%	Modulus for the remainder of the division
=	Equality

Calculation Modulus Example




```
// 1 : Number % SameNumber = 0
// 2 : Small % Big = Small
// 3 : Big % Small = Small - Big
```

If Statement

- If statement : used to execute a piece of code based on a condition.
- Condition: it’s a boolean expression means (true or false).

```
1 if (/* الشرط */)
2 {
3     // تعليمات التي يتم تنفيذها إذا كان الشرط صحيحا
4 }
```

If Statement (Symbols)

Symbol	purpose
==	Equal
>	Greater than
<	less than
>=	Greater than or equal
<=	less than or equal
&&	And
||	Or
!=	Not equal

Else if Statement

- The instructions **if & else** allow execution the decision between **two choices**.
- If you want to select option between **three choices** or more you can use the instruction of **else if** instead of sequential series (repetition) of if statements.

Example on (If & else Statements)

```
12
13  int main()
14  {
15      int a=10;
16      int z=12;
17      if(a==0)
18      {
19          cout<<"a is less thn 20\n";
20      }
21      else if (a==0)
22      {
23          cout<<"value of a is 11"<<endl;
24      }
25      else if (z=0)
26      {
27          cout<<"value of z is 12"<<endl;
28      }
29      else
30      {
31          cout<<"good bye";
32      }
33
```

```
good bye
```

For loop

❖ What's a loop?

- In programming, a loop is used to repeat a block of code until the specified condition is met.
- **Types:** 1) for 2) while 3) do while

Syntax:

```
1  for(initialization; condition test; increment or decrement)
2  {
3  //block of code to be executed repeatedly
4  }
```

For loop to repeat a statement

```
 8  ********************************************************
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15      for(int i=1;i<=5;i++)
16      {
17          cout<<"Hello c++"<<endl;
18      }
19
20      return 0;
21  }
```

```
Hello c++
Hello c++
Hello c++
Hello c++
```

While Statement

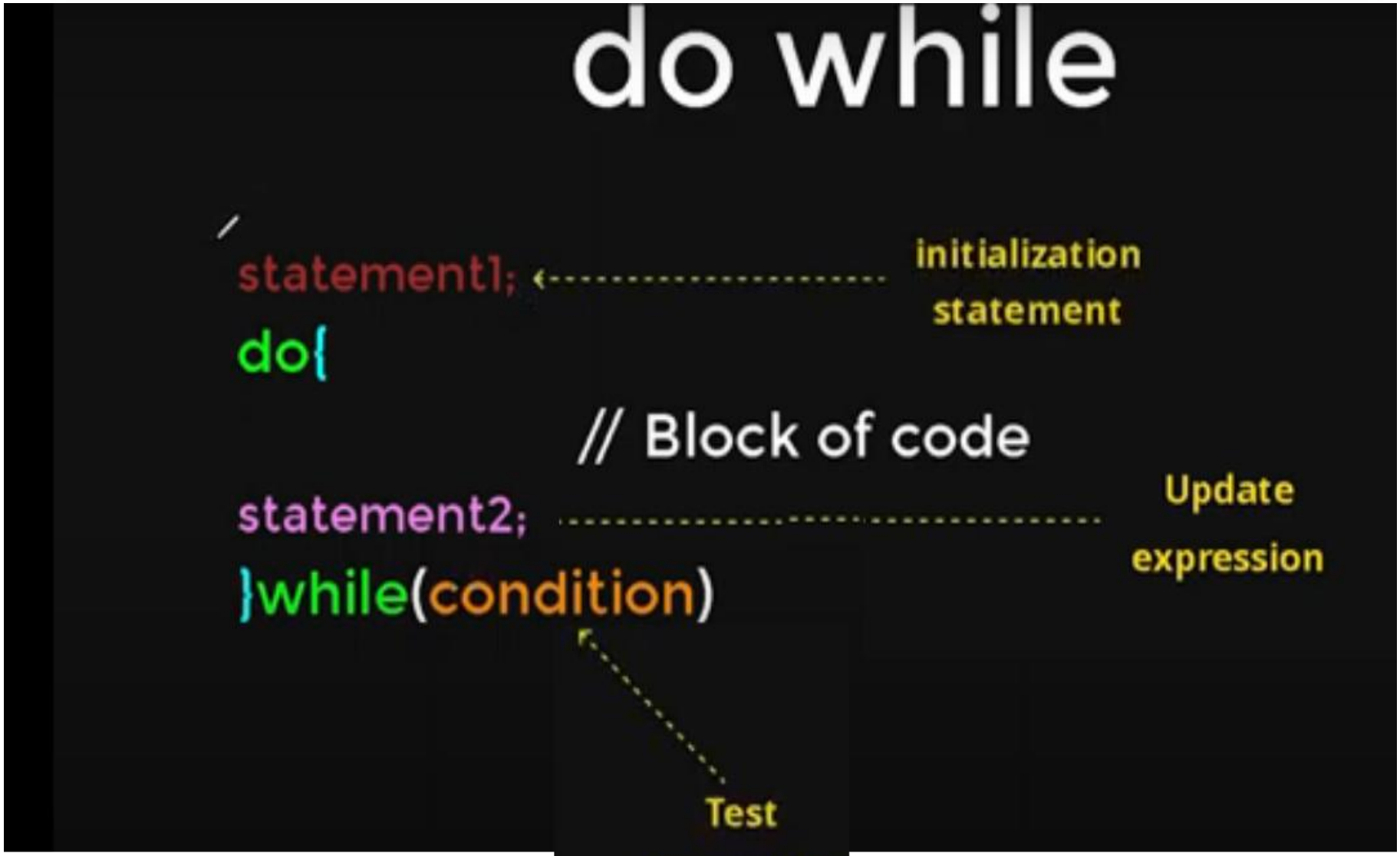
- While statement : used to execute a piece of code based on a condition.
- Condition: it's a boolean expression means (true or false).

Example on While Statement

```
8  ********************************************************************************
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15     int i=1;
16     while(i==1)
17     {
18         cout<<"Hi"<<endl;
19         i++;
20     }
21     return 0;
22 }
```

```
Hi
```

Do While Statement



Example on do While Statement

```
8  ********************************************************************
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15     int i=1;
16     do
17     {
18     cout<<"hello"<<endl;
19     i++;    //i=2
20     }
21     while(i==1);
22     return 0;
23 }
```

```
hello
```

Break & Continue statements

- Used with loops:

1) For

2) While

3)Do while

Break ➔ Exit the loop

Continue ➔ stop and continue (Skip)

Break statement

```
 8  **********************************************
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15      for (int i=0;i<10;i++)
16      {
17          if(i==5)
18          {
19              break;
20          }
21          cout<<"i="<<i<<endl;
22          }
23      return 0;
24  }
```

```
i=0
i=1
i=2
i=3
i=4
```

Continue statement

```
8  ********************************************************
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15     for (int i=1;i<5;i++)
16     {
17         if(i==3)
18         {
19             continue;
20         }
21         cout<<"i="<<i<<endl;
22         }
23       return 0;
24 }
```

```
i=1
i=2
i=4
```

Syntax

```
data_type array_name[size];
```

int float
double ... ect

same as
variable and
functions

integer (1, 2, 3 ...ect)

Declare Array

```
8  ********************************************
9  #include <iostream>
10
11 using namespace std;
12
13 int main()
14 {
15 int x[4]={2,3,4,5};
16 cout<<x[0]<<endl;
17 return 0;
18 }
```

0 1 2 3

```
2
```

Access value of an array

```
 8  **********************************************
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15  int x[4]={2,3,4,5};
16  for (int i=0;i<3;i++)
17  {
18    cout<<x[i]<<endl;
19  }
20
21  return 0;
22  }
```

```
2
3
4
```

Access value of an array (Postfix)

```
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15  int x[4]={2,3,4,5};
16  for (int i=0;i<4;i++)
17  {
18   x[i]++;
19  }
20  for (int i=0;i<4;i++)
21  {
22   cout<<x[i]<<endl;
23  }
24
25  return 0;
26  }
```

```
3
4
5
6
```

Access value of an array (Prefix)

```
 8  **********************************************************
 9  #include <iostream>
10
11  using namespace std;
12
13  int main()
14  {
15  int x[4]={2,3,4,5};
16  for (int i=0;i<4;i++)
17  {
18    ++x[i];
19  }
20  for (int i=0;i<4;i++)
21  {
22    cout<<x[i]<<endl;
23  }
24
25  return 0;
26  }
```

```
3
4
5
6
```


Thank
you