C++ | Nested Ternary Operator

Difficulty Level : Basic • Last Updated : 09 Dec, 2021

Ternary operator also known as conditional operator uses three operands to perform operation.

Syntax :

```
op1 ? op2 : op3;
```

Nested Ternary operator: Ternary operator can be nested. A nested ternary operator can have many forms like :

- a ? b : c
- a ? b: c ? d : e ? f : g ? h : i
- a ? b ? c : d : e

Let us understand the syntaxes one by one :

1. **a ? b : c =>** This ternary operator is similar to if-else statement. So it can be expressed in form of if-else statement.
   Expression using Ternary operator:

```
a ? b : c
```

Expression using if else statement:

```
if ( a )
    then b execute
else
    c execute
```

2.Example:

C++

```
// C++ program to illustrate
// nested ternary operators
#include <bits/stdc++.h>
using namespace std;

int main()
{
    cout << "Execute expression using"
    << " ternary operator: ";
    // Execute expression using
    // ternary operator
    int a = 2 > 5 ? 2 : 5;
    cout << a << endl;

    cout << "Execute expression using "
    << "if else statement: ";

    // Execute expression using if else
    if ( 2 > 5)
        cout << "2";
    else
        cout << "5";
    return 0;
```

Output:

```
Execute expression using ternary operator: 5
Execute expression using if else statement: 5
```

2. **a ? b: c ? d : e ? f : g ? h : i =>**This Nested ternary operator can be broken into if, else and else-if statement. The expression can break into smaller piece in ternary operator and if else statement which are given below:

Expression using ternary operator:

```
a ? b
    : c ? d
    : e ? f
    : g ? h
    : i
```

Expression using if else statement:

```
if a then b
   else if c then d
   else if e then f
   else if g then h
   else i
```

CPP

```
// C++ program to illustrate
// nested ternary operators
#include <bits/stdc++.h>

using namespace std;

int main()
{
    cout << "Execute expression using "
    << "ternary operator: ";
```

```
    cout << "Execute expression using "
    << "if else statement: ";
    if ( 2 > 3 )
        cout << "2";
    else if ( 3 > 4 )
        cout << "3";
    else
        cout << "4";
    return 0;
}
```

1.

Output:

```
Execute expression using ternary operator: 4
Execute expression using if else statement: 4
```

3. **a ? b ? c : d : e =>** Below is the expansion of expression using ternary operator and if else statement.

Expression using ternary operator:

```
 a ?
      b ? c
    : d
: e
```

Expression using if else statement:

```
if ( a )
    if ( b )
        c execute
    else
        d execute
else
    e execute
```

CPP

```cpp
// C++ program to illustrate
// nested ternary operators
#include <bits/stdc++.h>

using namespace std;

int main()
{
    cout << "Execute expression using "
    << "ternary operator: ";
    int a = 4 > 3 ? 2 > 4 ? 2 : 4 : 3;
    cout << a << endl;

    cout << "Execute expression using "
    << "if else statement: ";
    if ( 4 > 3 )
        if ( 2 > 4 )
            cout << "2";
        else
            cout << "4";
    else
        cout << "3";
    return 0;
}
```

Output:

```
Execute expression using ternary operator: 4
Execute expression using if else statement: 4
```

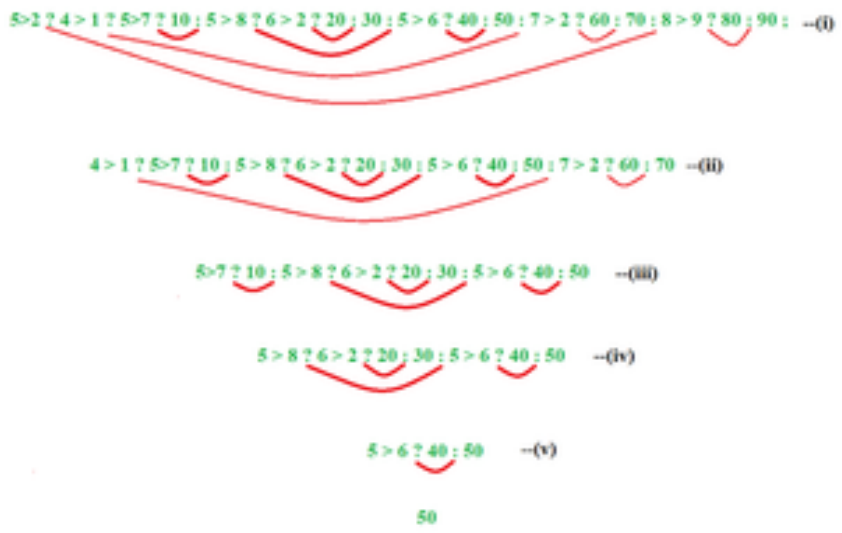
//improved by sathiyamoorthics19

Example 2: Evaluate the following statement.

5 > 2 ? 4 > 1 ? 5>7 ? 10 : 5 > 8 ? 6 > 2 ? 20 : 30 : 5 > 6 ? 40 : 50 : 7 > 2 ? 60 : 70 : 8 > 9 ? 80 : 90 ;

To solve the above problem, Grouping concept must be known.

1. Come to first colon (:) and match the left nearest question mark (?)
2. Repeat the process and continue until no colon (:) left



Key points :

First question mark (?) to colon (:)is considered as expression 2 and from that colon (:) to last is considered as expression 3

(i) 5 > 2 is true, so come to the expression 2 which is question mark (?) to colon (:)is considered as expression 2 and execute.

(ii) 4 > 1 is true, so come to the expression 2 and execute.

(iii) 5 > 7 is false, so come to expression 3 and execute.

(iv) 5 > 8 is false ,so come to expression 3 and execute.

(v) 5 > 6 is false again, so come to expression 3 and the answer is 50.

C

```
#include <stdio.h>

int main()
{
    int result;
    result =5>2 ? 4 > 1 ? 5>7 ? 10 : 5 > 8 ? 6 > 2 ? 20 : 30 : 5 > 6 ? 40 : 5
    printf("Output : %d", result);
    return 0;
```

```
//improved by sathiyamoorthics19
```

Output

```
Output : 50
```

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