

# Writing C++ Program using nested Conditional Statements to solve real world problems



# Working Example

John is an entrepreneur and he opens small shops in a few cities with different prices in dollars for the following products:

Product	Chicago	Phoenix	Houston
Coffee	0.50	0.40	0.45
Sweets	1.45	1.30	1.35
Water	0.80	0.70	0.70

Calculate the price (float) by the given city (string), product (string) and quantity (integer).

# Working Example: Test Cases

Input	Output
Product: Coffee City: Houston Quantity: 2	Price: 0.9
Product: Water City: Phoenix Quantity: 3	Price: 2.1
Product: Sweets City: Chicago Quantity: 5	Price: 7.25

# Solution

Lets see the solution **step by step** using **nested If statements**.



# || Step 1

First of all, take **product**, **city** and **quantity** as input from the user.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
```

## Step 2

Apply conditions of different prices if the product is **Coffee** and the city is **Chicago**, **Phoenix** or **Houston**.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee"){
14         if(city == "Chicago"){
15             price = quantity * 0.50;
16         }
17         if(city == "Phoenix"){
18             price = quantity * 0.40;
19         }
20         if(city == "Houston"){
21             price = quantity * 0.45;
22         }
23     }
```

## Step 3

Apply conditions of different prices if the product is **Sweets** and the city is **Chicago**, **Phoenix** or **Houston**.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee"){
14         if(city == "Chicago"){
15             price = quantity * 0.50;
16         }
17         if(city == "Phoenix"){
18             price = quantity * 0.40;
19         }
20         if(city == "Houston"){
21             price = quantity * 0.45;
22         }
23     }
```

```
24     if (product == "Sweets"){
25         if(city == "Chicago"){
26             price = quantity * 1.45;
27         }
28         if(city == "Phoenix"){
29             price = quantity * 1.30;
30         }
31         if(city == "Houston"){
32             price = quantity * 1.35;
33         }
34     }
```

## Step 4

Apply conditions of different prices if the product is **Water** and the city is **Chicago**, **Phoenix** or **Houston**.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee"){
14         if(city == "Chicago"){
15             price = quantity * 0.50;
16         }
17         if(city == "Phoenix"){
18             price = quantity * 0.40;
19         }
20         if(city == "Houston"){
21             price = quantity * 0.45;
22         }
23     }
```

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45
if (product == "Sweets"){
    if(city == "Chicago"){
        price = quantity * 1.45;
    }
    if(city == "Phoenix"){
        price = quantity * 1.30;
    }
    if(city == "Houston"){
        price = quantity * 1.35;
    }
}
if (product == "Water"){
    if(city == "Chicago"){
        price = quantity * 0.80;
    }
    if(city == "Phoenix"){
        price = quantity * 0.70;
    }
    if(city == "Houston"){
        price = quantity * 0.70;
    }
}
```



## Step 5

Display the  
calculated  
**price** on the  
Console.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee"){
14         if(city == "Chicago"){
15             price = quantity * 0.50;
16         }
17         if(city == "Phoenix"){
18             price = quantity * 0.40;
19         }
20         if(city == "Houston"){
21             price = quantity * 0.45;
22         }
23     }
```

```
24     if (product == "Sweets"){
25         if(city == "Chicago"){
26             price = quantity * 1.45;
27         }
28         if(city == "Phoenix"){
29             price = quantity * 1.30;
30         }
31         if(city == "Houston"){
32             price = quantity * 1.35;
33         }
34     }
35     if (product == "Water"){
36         if(city == "Chicago"){
37             price = quantity * 0.80;
38         }
39         if(city == "Phoenix"){
40             price = quantity * 0.70;
41         }
42         if(city == "Houston"){
43             price = quantity * 0.70;
44         }
45     }
46     cout << "Price: " << price;
47 }
```

# Output on the Console

```
C:\C++>example.exe  
Product: Water  
City: Phoenix  
Quantity: 3  
Price: 2.1
```

```
C:\C++>example.exe  
Product: Sweets  
City: Chicago  
Quantity: 5  
Price: 7.25
```

```
C:\C++>example.exe  
Product: Coffee  
City: Houston  
Quantity: 2  
Price: 0.9
```

# Solution

This solution was with **Nested Ifs**. Lets see how we can use **logical operators** to add more than 1 condition in a single IF statement.



# || Step 1

First of all,  
take **product**,  
**city** and  
**quantity** as  
input from  
the user.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
```

## Step 2

Apply conditions of different prices if the product is **Coffee** and the city is **Chicago**, **Phoenix** or **Houston** using **AND** logical operator.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee" && city == "Chicago"){
14         price = quantity * 0.50;
15     }
16     if(product == "Coffee" && city == "Phoenix"){
17         price = quantity * 0.40;
18     }
19     if(product == "Coffee" && city == "Houston"){
20         price = quantity * 0.45;
21     }
```

# Step 3

Apply conditions of different prices if the product is **Sweets** and the city is **Chicago**, **Phoenix** or **Houston** using **AND** logical operator.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee" && city == "Chicago"){
14         price = quantity * 0.50;
15     }
16     if(product == "Coffee" && city == "Phoenix"){
17         price = quantity * 0.40;
18     }
19     if(product == "Coffee" && city == "Houston"){
20         price = quantity * 0.45;
21     }
22     if (product == "Sweets" && city == "Chicago"){
23         price = quantity * 1.45;
24     }
25     if(product == "Sweets" && city == "Phoenix"){
26         price = quantity * 1.30;
27     }
28     if(product == "Sweets" && city == "Houston"){
29         price = quantity * 1.35;
30     }
```

## Step 4

Apply conditions of different prices if the product is **Water** and the city is **Chicago**, **Phoenix** or **Houston** using **AND** and **OR** logical operator.

```
1 #include <iostream>
2 using namespace std;
3 main(){
4     string product, city;
5     int quantity;
6     float price;
7     cout << "Product: ";
8     cin >> product;
9     cout << "City: ";
10    cin >> city;
11    cout << "Quantity: ";
12    cin >> quantity;
13    if (product == "Coffee" && city == "Chicago"){
14        price = quantity * 0.50;
15    }
16    if(product == "Coffee" && city == "Phoenix"){
17        price = quantity * 0.40;
18    }
19    if(product == "Coffee" && city == "Houston"){
20        price = quantity * 0.45;
21    }
22    if (product == "Sweets" && city == "Chicago"){
23        price = quantity * 1.45;
24    }
25    if(product == "Sweets" && city == "Phoenix"){
26        price = quantity * 1.30;
27    }
28    if(product == "Sweets" && city == "Houston"){
29        price = quantity * 1.35;
30    }
31    if (product == "Water" && city == "Chicago"){
32        price = quantity * 0.80;
33    }
34    if(product == "Water" && (city == "Phoenix" || city == "Houston")){
35        price = quantity * 0.70;
36    }
```



# Step 5

Display the  
calculated  
**price** on the  
Console.

```
1  #include <iostream>
2  using namespace std;
3  main(){
4      string product, city;
5      int quantity;
6      float price;
7      cout << "Product: ";
8      cin >> product;
9      cout << "City: ";
10     cin >> city;
11     cout << "Quantity: ";
12     cin >> quantity;
13     if (product == "Coffee" && city == "Chicago"){
14         price = quantity * 0.50;
15     }
16     if(product == "Coffee" && city == "Phoenix"){
17         price = quantity * 0.40;
18     }
19     if(product == "Coffee" && city == "Houston"){
20         price = quantity * 0.45;
21     }
22     if (product == "Sweets" && city == "Chicago"){
23         price = quantity * 1.45;
24     }
25     if(product == "Sweets" && city == "Phoenix"){
26         price = quantity * 1.30;
27     }
28     if(product == "Sweets" && city == "Houston"){
29         price = quantity * 1.35;
30     }
31     if (product == "Water" && city == "Chicago"){
32         price = quantity * 0.80;
33     }
34     if(product == "Water" && (city == "Phoenix" || city == "Houston")){
35         price = quantity * 0.70;
36     }
37     cout << "Price: " << price;
38 }
```



# Learning Objective

In this lecture, we learnt how to write a **C++** program that takes **input** from the user, **apply nested conditions** or conditions using **logical operators** based on the input and gives **output** on Console.



# Self Assessment

Depending on age (decimal number) and gender (m / f), print a personal title:

"**Mr.**" - a man (gender "m") - 16 or more years old.

"**Mister**" - a boy (gender "m") under 16 years.

"**Ms.**" - a woman (gender "f") - 16 or more years old.

"**Miss**" - a girl (gender "f") under 16 years.



# Self Assessment

Test Cases:

Input	Output
12 f	Miss
13.5 m	Mister
17 m	Mr.
25 f	Ms.

