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.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee"){
        if(city == "Chicago"){
            price = quantity * 0.50;
        }
        if(city == "Phoenix"){
            price = quantity * 0.40;
        }
        if(city == "Houston"){
            price = quantity * 0.45;
        }
    }
```

Step 3

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

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee"){
        if(city == "Chicago"){
            price = quantity * 0.50;
        }
        if(city == "Phoenix"){
            price = quantity * 0.40;
        }
        if(city == "Houston"){
            price = quantity * 0.45;
        }
    }
    if (product == "Sweets"){
        if(city == "Chicago"){
            price = quantity * 1.45;
        }
        if(city == "Phoenix"){
            price = quantity * 1.30;
        }
        if(city == "Houston"){
            price = quantity * 1.35;
        }
    }
```

Step 4

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

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee"){
        if(city == "Chicago"){
            price = quantity * 0.50;
        }
        if(city == "Phoenix"){
            price = quantity * 0.40;
        }
        if(city == "Houston"){
            price = quantity * 0.45;
        }
    }
    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.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee"){
        if(city == "Chicago"){
            price = quantity * 0.50;
        }
        if(city == "Phoenix"){
            price = quantity * 0.40;
        }
        if(city == "Houston"){
            price = quantity * 0.45;
        }
    }
    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;
        }
    }
    cout << "Price: " << price;
}
```

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.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    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.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee" && city == "Chicago"){
        price = quantity * 0.50;
    }
    if(product == "Coffee" && city == "Phoenix"){
        price = quantity * 0.40;
    }
    if(product == "Coffee" && city == "Houston"){
        price = quantity * 0.45;
    }
```

Step 3

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

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee" && city == "Chicago"){
        price = quantity * 0.50;
    }
    if(product == "Coffee" && city == "Phoenix"){
        price = quantity * 0.40;
    }
    if(product == "Coffee" && city == "Houston"){
        price = quantity * 0.45;
    }
    if (product == "Sweets" && city == "Chicago"){
        price = quantity * 1.45;
    }
    if(product == "Sweets" && city == "Phoenix"){
        price = quantity * 1.30;
    }
    if(product == "Sweets" && city == "Houston"){
        price = quantity * 1.35;
    }
```

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.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee" && city == "Chicago"){
        price = quantity * 0.50;
    }
    if(product == "Coffee" && city == "Phoenix"){
        price = quantity * 0.40;
    }
    if(product == "Coffee" && city == "Houston"){
        price = quantity * 0.45;
    }
    if (product == "Sweets" && city == "Chicago"){
        price = quantity * 1.45;
    }
    if(product == "Sweets" && city == "Phoenix"){
        price = quantity * 1.30;
    }
    if(product == "Sweets" && city == "Houston"){
        price = quantity * 1.35;
    }
    if (product == "Water" && city == "Chicago"){
        price = quantity * 0.80;
    }
    if(product == "Water" && (city == "Phoenix" || city == "Houston")){
        price = quantity * 0.70;
    }
```

Step 5

Display the calculated price on the Console.

```
#include <iostream>
using namespace std;
main(){
    string product, city;
    int quantity;
    float price;
    cout << "Product: ";
    cin >> product;
    cout << "City: ";
    cin >> city;
    cout << "Quantity: ";
    cin >> quantity;
    if (product == "Coffee" && city == "Chicago"){
        price = quantity * 0.50;
    }
    if(product == "Coffee" && city == "Phoenix"){
        price = quantity * 0.40;
    }
    if(product == "Coffee" && city == "Houston"){
        price = quantity * 0.45;
    }
    if (product == "Sweets" && city == "Chicago"){
        price = quantity * 1.45;
    }
    if(product == "Sweets" && city == "Phoenix"){
        price = quantity * 1.30;
    }
    if(product == "Sweets" && city == "Houston"){
        price = quantity * 1.35;
    }
    if (product == "Water" && city == "Chicago"){
        price = quantity * 0.80;
    }
    if(product == "Water" && (city == "Phoenix" || city == "Houston")){
        price = quantity * 0.70;
    }
    cout << "Price: " << price;
}
```

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.