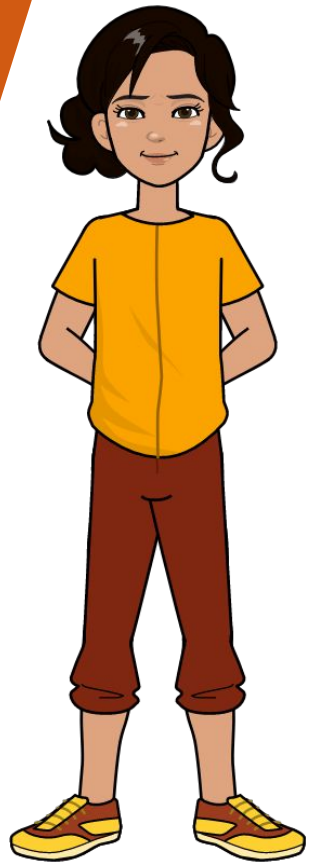
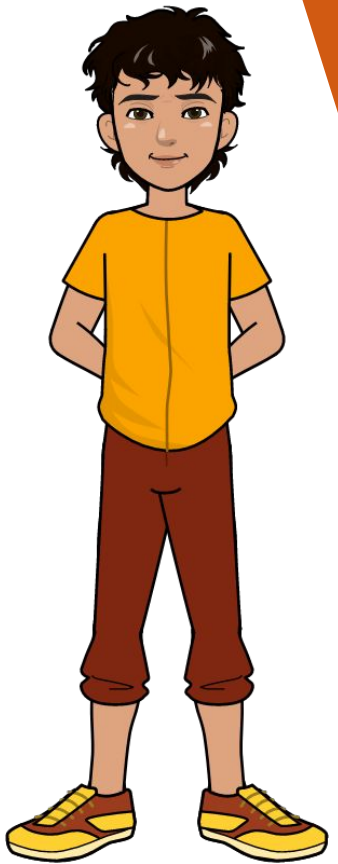


First Version of POS System



Requirements

We want to make a Simple console based Menu System like this.

```
**********************************************************
*                  Console Based Menu System             *
**********************************************************

Select one of the following options number...
1. Enter Option 1
2. Enter Option 2
3. Enter Option 3
Your Option..
```

Requirements

```
**********************************************************
*                Console Based Menu System               *
**********************************************************

Select one of the following options number...
1. Enter Option 1
2. Enter Option 2
3. Enter Option 3
Your Option..1
You have Entered Option 1
```

```
**********************************************************
*                Console Based Menu System               *
**********************************************************

Select one of the following options number...
1. Enter Option 1
2. Enter Option 2
3. Enter Option 3
Your Option..2
You have Entered Option 2
```

```
**********************************************************
*                Console Based Menu System               *
**********************************************************

Select one of the following options number...
1. Enter Option 1
2. Enter Option 2
3. Enter Option 3
Your Option..3
You have Entered Option 3
```

Requirements

How can we do that?

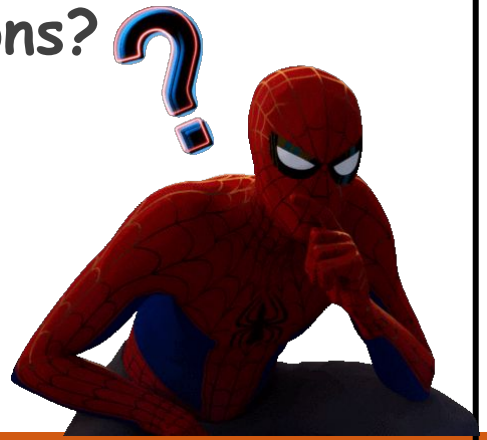
```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;

}
```

```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
}
```

```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
    if (option == 1){
        cout << "You have Entered Option 1";
    }
    if (option == 2){
        cout << "You have Entered Option 2";
    }
    if (option == 3){
        cout << "You have Entered Option 3";
    }
}
```

```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
    if (option == 1){
        cout << "You have Entered Option 1";
    }
    if (option == 2){
        cout << "You have Entered Option 2";
    }
    if (option == 3){
        cout << "You have Entered Option 3";
    }
}
```

Can we divide this code into functions?



```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
    if (option == 1){
        cout << "You have Entered Option 1";
    }
    if (option == 2){
        cout << "You have Entered Option 2";
    }
    if (option == 3){
        cout << "You have Entered Option 3";
    }
}
```

We can make a function to just display the header.

```
#include <iostream>
using namespace std;
main()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
    if (option == 1){
        cout << "You have Entered Option 1";
    }
    if (option == 2){
        cout << "You have Entered Option 2";
    }
    if (option == 3){
        cout << "You have Entered Option 3";
    }
}
```

We can make a function to display the menu and take the input from the user

Solution

Lets see the solution with functions

```
void header()
{
    cout << "*************************************************************" << endl;
    cout << "*                  Console Based Menu System                *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl;
}
```

```
int menu()
{
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Enter Option 1" << endl;
    cout << "2. Enter Option 2" << endl;
    cout << "3. Enter Option 3" << endl;
    cout << "Your Option..";
    cin >> option;
    return option;
}
```

```
#include <iostream>
using namespace std;
void header();
int menu();
main()
{
     int option;
     header();
     option = menu();
     if (option == 1)
     {
          cout << "You have Entered Option 1";
     }
     if (option == 2)
     {
          cout << "You have Entered Option 2";
     }
     if (option == 3)
     {
          cout << "You have Entered Option 3";
     }
}
```

Benefits of Functions

Now, The code looks organized and readable. We can easily understand the functionality of the code by looking at the main function now.

Point of Sale Management System

Let's move towards the more realistic application.

POS: Requirements

Make a Point of Sales Management System with the following options now.

```
************************************************************
*                Point of Sales Management System          *
************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option..
```

POS: Option 1

```
************************************************************
*                Point of Sales Management System          *
************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 1
Enter the name of 1st Product: Eggs
Enter the price of 1st Product: 200
Enter the quantity of 1st Product: 6
Enter the tax rate on 1st Product (%): 2
Enter any key to continue..
```

POS: Option 2

```
************************************************************
*                Point of Sales Management System          *
************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 2
Enter the name of 2nd Product: Bread
Enter the price of 2nd Product: 250
Enter the quantity of 2nd Product: 2
Enter the tax rate on 2nd Product (%): 2
Enter any key to continue..
```

POS: Option 3

```
************************************************************
*                Point of Sales Management System          *
************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 3
Enter the name of 3rd Product: Juice
Enter the price of 3rd Product: 400
Enter the quantity of 3rd Product: 1
Enter the tax rate on 3rd Product (%): 4
Enter any key to continue..
```

POS: Option 4

```
**************************************************************
*                Point of Sales Management System            *
**************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 4
Total Payable Amount (including tax): 2150
Enter any key to continue..
```

POS: Option 5

```
************************************************************
*                Point of Sales Management System          *
************************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 5
All Products Data
Name    Price   Quantity        Tax     TotalPerProduct
Eggs    200     6               2       1224
Bread   250     2               2       510
Juice   400     1               4       416
Enter any key to continue..
```

POS: Option 6

```
**********************************************************
*                Point of Sales Management System        *
**********************************************************


Select one of the following options number...
1. Add 1st Product Data
2. Add 2nd Product Data
3. Add 3rd Product Data
4. Calculate Total
5. View All Products Data
6. Exit
Your Option.. 6

G:\Semesters\Programming Fundamentals (Fall 2023)\POS>
```

Solution

Let's first make the function of the header and menu.

Solution

```
void printHeader()
{
    cout << "*************************************************************" << endl;
    cout << "*                Point of Sale Management System            *" << endl;
    cout << "*************************************************************" << endl;
    cout << endl << endl;
}
int menu()
{
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Add 1st Product Data" << endl;
    cout << "2. Add 2nd Product Data" << endl;
    cout << "3. Add 3rd Product Data" << endl;
    cout << "4. Calculate Total" << endl;
    cout << "5. View All Products Data" << endl;
    cout << "6. Exit" << endl;
    cout << "Your Option.. ";
    cin >> option;
    return option;
}
```

Main Function

```
#include <iostream>
using namespace std;
void printHeader();
int menu();
int main()
{
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;

    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
    }
}
```

Main Function

We have to make the user allow to see the screen until he/she presses any key then clear the previous screen.

```
#include <iostream>
using namespace std;
void printHeader();
int menu();
int main()
{
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;

    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
    }
}
```

Main Function

We have to make the user allow to see the screen until he/she presses any key then clear the previous screen.

```
#include <iostream>
using namespace std;
void printHeader();
int menu();
int main()
{
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;
    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
        cout << "Press any Key to Continue: ";
        getch();
        system("cls");
    }
}
```

Main Function

getch() function stands for get character from the console. It will wait for the further execution until the user presses any keyboard key.

```
#include <iostream>
using namespace std;
void printHeader();
int menu();
int main()
{
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;
    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
        cout << "Press any Key to Continue: ";
        getch();
        system("cls");
    }
}
```

Main Function

getch() function is defined in the conio.h library therefore, we have to include it before using it.

```
#include <iostream>
using namespace std;
void printHeader();
int menu();
int main()
{
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;
    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
        cout << "Press any Key to Continue: ";
        getch();
        system("cls");
    }
}
```

Main Function

getch() function is defined in the conio.h library therefore, we have to include it before using it.

```
#include <iostream>
#include <conio.h>
using namespace std;
void printHeader();
int menu();
int main(){
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;
    while (true)
    {
        printHeader();
        int option = menu();
        if (option == 1) { }
        if (option == 2) { }
        if (option == 3) { }
        if (option == 4) { }
        if (option == 5) { }
        if (option == 6) { }
        cout << "Press any Key to Continue: ";
        getch();
        system("cls");
    }
}
```

Solution: Option 1

```
if (option == 1)
        {
            cout << "Enter the name of 1st Product: ";
            cin >> name1;
            cout << "Enter the price of 1st Product: ";
            cin >> price1;
            cout << "Enter the quantity of 1st Product: ";
            cin >> quantity1;
            cout << "Enter the tax rate on 1st Product (%): ";
            cin >> tax1;
        }
```

Solution: Option 2

```
if (option == 2)
        {
            cout << "Enter the name of 2nd Product: ";
            cin >> name2;
            cout << "Enter the price of 2nd Product: ";
            cin >> price2;
            cout << "Enter the quantity of 2nd Product: ";
            cin >> quantity2;
            cout << "Enter the tax rate on 2nd Product (%): ";
            cin >> tax2;
        }
```

Solution: Option 3

```
if (option == 3)
        {
            cout << "Enter the name of 3rd Product: ";
            cin >> name3;
            cout << "Enter the price of 3rd Product: ";
            cin >> price3;
            cout << "Enter the quantity of 3rd Product: ";
            cin >> quantity3;
            cout << "Enter the tax rate on 3rd Product (%): ";
            cin >> tax3;
        }
```

Solution: Option 4

```
if (option == 4)
        {
            total1 = price1 * quantity1;
            total1 = total1 + total1 * ((tax1 / 100));
            total2 = price2 * quantity2;
            total2 = total2 + total2 * ((tax2 / 100));
            total3 = price3 * quantity3;
            total3 = total3 + total3 * ((tax3 / 100));

            float totalPayable = total1 + total2 + total3;

            cout << "Total Payable Amount (including tax): " << totalPayable << endl;
        }
```

Solution: Option 5

```
if (option == 5)
        {

            cout << "All Products Data" << endl;
            cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" <<
"Total" << endl;
            cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" <<
total1 << endl;
            cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" <<
total2 << endl;
            cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" <<
total3 << endl;
        }
```

Solution: Option 6

```
if (option == 6)
        {
            return 0;
        }
```

Solution

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
     cout << "All Products Data" << endl;
     cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
     cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
     cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
     cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

Do you see any of the code repeating in any of the options?

Solution

Can you identify the code?

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
     cout << "All Products Data" << endl;
     cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
     cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
     cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
     cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

Solution

Can you identify the code?

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
     cout << "All Products Data" << endl;
     cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
     cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
     cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
     cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

Solution

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
     cout << "All Products Data" << endl;
     cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
     cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
     cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
     cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

Here we are calculating the total by using the same formula 3 times.

Solution

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
      cout << "All Products Data" << endl;
      cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
      cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
      cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
      cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

We can further improve the code readability by making a function that will take information of the Product and calculate its total

Solution

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
     cout << "All Products Data" << endl;
     cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
     cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
     cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
     cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

Here we are printing the data 3 times.

Solution

```
if (option == 4)
{

      total1 = price1 * quantity1;
      total1 = total1 + total1 * ((tax1 / 100));
      total2 = price2 * quantity2;
      total2 = total2 + total2 * ((tax2 / 100));
      total3 = price3 * quantity3;
      total3 = total3 + total3 * ((tax3 / 100));

      float totalPayable = total1 + total2 + total3;

      cout << "Total Payable Amount (including tax): " << totalPayable << endl;
}

if (option == 5)
{
      cout << "All Products Data" << endl;
      cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" << "Total" << endl;
      cout << name1 << "\t" << price1 << "\t" << quantity1 << "\t\t" << tax1 << "\t" << total1 << endl;
      cout << name2 << "\t" << price2 << "\t" << quantity2 << "\t\t" << tax2 << "\t" << total2 << endl;
      cout << name3 << "\t" << price3 << "\t" << quantity3 << "\t\t" << tax3 << "\t" << total3 << endl;
}
```

We can further improve the code readability by making a function that will take information of the Product and print it on console in specific format.

Solution: With Functions

Let's further make the functions of calculateCostPerProduct and printProductData.

Solution: Previous Functions

```
void printHeader()
{
    cout << "************************************************************" << endl;
    cout << "*                Point of Sale Management System           *" << endl;
    cout << "************************************************************" << endl;
    cout << endl << endl;
}
int menu()
{
    int option;
    cout << "Select one of the following options number..." << endl;
    cout << "1. Add 1st Product Data" << endl;
    cout << "2. Add 2nd Product Data" << endl;
    cout << "3. Add 3rd Product Data" << endl;
    cout << "4. Calculate Total" << endl;
    cout << "5. View All Products Data" << endl;
    cout << "6. Exit" << endl;
    cout << "Your Option.. ";
    cin >> option;
    return option;
}
```

Solution: New Functions

```
float calculateCostPerProduct(float price, int quantity, float tax)
{
    float total;
    total = price * quantity;
    total = total + total * ((tax / 100));
    return total;
}

void printProductData(string name, float price, int quantity, float tax, float total)
{
    cout << name << "\t" << price << "\t" << quantity << "\t\t" << tax << "\t" << total << endl;
}
```

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

void printHeader();
int menu();
float calculateCostPerProduct(float price, float quantity, float tax);
void printProductData(string name, float price, float quantity, float tax, float total);
int main(){
    string name1 = "", name2 = "", name3 = "";
    float price1 = 0.0, price2 = 0.0, price3 = 0.0;
    int quantity1 = 0, quantity2 = 0, quantity3 = 0;
    float tax1 = 0.0, tax2 = 0.0, tax3 = 0.0;
    float total1 = 0.0, total2 = 0.0, total3 = 0.0;
    int option;
    while (true)
    {
        printHeader();
        option = menu();
        if (option == 1)
        {
            cout << "Enter the name of 1st Product: ";
            cin >> name1;
            cout << "Enter the price of 1st Product: ";
            cin >> price1;
            cout << "Enter the quantity of 1st Product: ";
            cin >> quantity1;
            cout << "Enter the tax rate on 1st Product (%): ";
            cin >> tax1;
        }
```

```
if (option == 2)
{

    cout << "Enter the name of 2nd Product: ";
    cin >> name2;
    cout << "Enter the price of 2nd Product: ";
    cin >> price2;
    cout << "Enter the quantity of 2nd Product: ";
    cin >> quantity2;
    cout << "Enter the tax rate on 2nd Product (%): ";
    cin >> tax2;
}
if (option == 3)
{

    cout << "Enter the name of 3rd Product: ";
    cin >> name3;
    cout << "Enter the price of 3rd Product: ";
    cin >> price3;
    cout << "Enter the quantity of 3rd Product: ";
    cin >> quantity3;
    cout << "Enter the tax rate on 3rd Product (%): ";
    cin >> tax3;
}
```

```
        if (option == 4)
        {
            total1 = calculateCostPerProduct(price1, quantity1, tax1);
            total2 = calculateCostPerProduct(price2, quantity2, tax2);
            total3 = calculateCostPerProduct(price3, quantity3, tax3);
            float totalPayable = total1 + total2 + total3;
            cout << "Total Payable Amount (including tax): 2150" << endl;
        }
        if (option == 5)
        {
            cout << "All Products Data" << endl;
            cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" <<
"TotalPerProduct" << endl;
            printProductData(name1, price1, quantity1, tax1, total1);
            printProductData(name2, price2, quantity2, tax2, total2);
            printProductData(name3, price3, quantity3, tax3, total3);
        }
        if (option == 6)
        {
            return 0;
        }
        cout << "Press any Key to Continue: ";
        getch();
        system("cls");
}
```

```
    if (option == 4)
    {
        total1 = calculateCostPerProduct(price1, quantity1, tax1);
        total2 = calculateCostPerProduct(price2, quantity2, tax2);
        total3 = calculateCostPerProduct(price3, quantity3, tax3);
        float totalPayable = total1 + total2 + total3;
        cout << "Total Payable Amount (including tax): 2150" << endl;
    }
    if (option == 5)
    {
        cout << "All Products Data" << endl;
        cout << "Name" << "\t" << "Price " << "\t" << "Quantity" << "\t" << "Tax" << "\t" <<
       "TotalPerProduct" << endl;
        printProductData(name1, price1, quantity1, tax1, total1);
        printProductData(name2, price2, quantity2, tax2, total2);
        printProductData(name3, price3, quantity3, tax3, total3);
    }
    if (option == 6)
    {
        return 0;
    }
    cout << "Press any Key to Continue: ";
    getch();
    system("cls");
}
```

We can further improve the code by making separate two functions for these functionalities.

Learning Outcome

Categorize the code into **meaningful functions** to make the code more **modular**, **readable**, **structured**, and **reusable**.