

OBJECT ORIENTED PROGRAMMING

Chapter 1: Concept of Object Oriented Programming

Coding Problems & Solutions — Set 3

The following programs are based on the structure of a C++ program and console input/output using cin and cout, as covered in this chapter. Each problem is followed by a complete working solution and its sample output.

Q1. Write a C++ program to convert a temperature given in degrees Celsius into degrees Fahrenheit.

Solution:

```
#include <iostream.h>
void main()
{
    float celsius, fahrenheit;
    cout << "Enter temperature in Celsius: ";
    cin >> celsius;
    fahrenheit = (celsius * 9 / 5) + 32;
    cout << "Temperature in Fahrenheit = " << fahrenheit;
}
```

Output:

```
Enter temperature in Celsius: 37
Temperature in Fahrenheit = 98.6
```

Q2. Write a C++ program to accept the cost price and selling price of an item and display the profit or loss amount.

Solution:

```
#include <iostream.h>
void main()
{
    float costPrice, sellingPrice, result;
    cout << "Enter cost price: ";
    cin >> costPrice;
    cout << "Enter selling price: ";
    cin >> sellingPrice;
    result = sellingPrice - costPrice;
    cout << "Profit/Loss amount = " << result;
}
```

Output:

```
Enter cost price: 500
Enter selling price: 620
Profit/Loss amount = 120
```

Note: A positive result indicates profit and a negative result indicates loss. Separating the two with a message such as "Profit" or "Loss" requires the if-else construct, which is covered in a later chapter.

Q3. Write a C++ program to accept the marks obtained by a student in three subjects (out of 100 each) and calculate the percentage.

Solution:

```
#include <iostream.h>
void main()
{
    float m1, m2, m3, total, percentage;
    cout << "Enter marks in three subjects (out of 100 each): ";
    cin >> m1 >> m2 >> m3;
    total = m1 + m2 + m3;
    percentage = (total / 300) * 100;
    cout << "Total Marks = " << total << endl;
    cout << "Percentage = " << percentage << "%";
}
```

Output:

```
Enter marks in three subjects (out of 100 each): 78 82 90
Total Marks = 250
Percentage = 83.3333%
```

Q4. Write a C++ program to accept the basic salary of an employee and calculate the gross salary, given HRA as 20% and DA as 30% of the basic salary.

Solution:

```
#include <iostream.h>
void main()
{
    float basic, hra, da, gross;
    cout << "Enter basic salary: ";
    cin >> basic;
    hra = 0.20 * basic;
    da = 0.30 * basic;
    gross = basic + hra + da;
    cout << "HRA = " << hra << endl;
    cout << "DA = " << da << endl;
    cout << "Gross Salary = " << gross;
}
```

Output:

```
Enter basic salary: 20000
HRA = 4000
DA = 6000
Gross Salary = 30000
```

Q5. Write a C++ program to accept two numbers and display their sum, average and product using a single cascaded cout statement.

Solution:

```
#include <iostream.h>
void main()
{
```

```
float a, b;
cout << "Enter two numbers: ";
cin >> a >> b;
cout << "Sum = " << (a + b) << ", Average = " << ((a + b) / 2)
    << ", Product = " << (a * b) << endl;
}
```

Output:

```
Enter two numbers: 8 12
Sum = 20, Average = 10, Product = 96
```

Q6. Write a C++ program to convert a distance given in kilometres into miles (1 km = 0.6214 miles).

Solution:

```
#include <iostream.h>
void main()
{
    float km, miles;
    cout << "Enter distance in kilometres: ";
    cin >> km;
    miles = km * 0.6214;
    cout << "Distance in miles = " << miles;
}
```

Output:

```
Enter distance in kilometres: 10
Distance in miles = 6.214
```

Q7. Write a C++ program to accept the radius and height of a cylinder and calculate its volume and total surface area.

Solution:

```
#include <iostream.h>
void main()
{
    float radius, height, volume, tsa;
    const float PI = 3.1416;
    cout << "Enter radius and height of cylinder: ";
    cin >> radius >> height;
    volume = PI * radius * radius * height;
    tsa = 2 * PI * radius * (radius + height);
    cout << "Volume = " << volume << endl;
    cout << "Total Surface Area = " << tsa;
}
```

Output:

```
Enter radius and height of cylinder: 7 10
Volume = 1539.38
Total Surface Area = 748.442
```

Q8. Write a C++ program to accept a character from the user and display its ASCII (integer) value.

Solution:

```
#include <iostream.h>
void main()
{
    char ch;
    cout << "Enter a character: ";
    cin >> ch;
    cout << "ASCII value of " << ch << " is " << int(ch);
}
```

Output:

```
Enter a character: A
ASCII value of A is 65
```

Q9. Write a C++ program to display the size (in bytes) of the int, float, char and double data types using the sizeof() operator.

Solution:

```
#include <iostream.h>
void main()
{
    cout << "Size of int = " << sizeof(int) << " bytes" << endl;
    cout << "Size of float = " << sizeof(float) << " bytes" << endl;
    cout << "Size of char = " << sizeof(char) << " bytes" << endl;
    cout << "Size of double = " << sizeof(double) << " bytes";
}
```

Output:

```
Size of int = 2 bytes
Size of float = 4 bytes
Size of char = 1 bytes
Size of double = 8 bytes
```

Note: sizeof(int) may display as 4 bytes instead of 2 bytes depending on the compiler; the value shown above (2 bytes) follows the older 16-bit Turbo C++ compiler convention still referenced in many diploma-level textbooks.

Q10. Write a C++ program to accept the price of a single item and the quantity purchased, and calculate the total bill amount.

Solution:

```
#include <iostream.h>
void main()
{
    float price, totalBill;
    int quantity;
    cout << "Enter price of one item: ";
    cin >> price;
    cout << "Enter quantity purchased: ";
    cin >> quantity;
    totalBill = price * quantity;
    cout << "Total Bill Amount = " << totalBill;
```

```
}
```

Output:

```
Enter price of one item: 45.50  
Enter quantity purchased: 6  
Total Bill Amount = 273
```

Note: All the above programs use void main() and the iostream.h header, following the older Turbo C++ style commonly used at the diploma/polytechnic level. In standard modern C++ (ISO C++), the equivalent structure uses #include <iostream>, the statement using namespace std;, and int main() with a return 0; statement at the end.