UNIVERSITI SAINS MALAYSIA

SCHOOL OF COMPUTER SCIECES
UNIVERSITI SAINS MALAYSIA
ACADEMIC SESSION: 2024/2025

CPT 111 – PRINCIPLES OF PROGRAMMING
WEEK 2 & 3: PROGRAMMING LAB
MORE ABOUT SYNTAX

Describe what the following programs do

1.

```cpp
#include <iostream>
using namespace std;

int main()
{
    // Variables to hold the monthly pay and the
    // amount of contribution.
    double monthlyPay = 6000.0, contribution;

    // Calculate and display a 5% contribution.
    contribution = monthlyPay * 0.05;
    cout << "5 percent is $" << contribution
         << " per month.\n";

    // Calculate and display a 7% contribution.
    contribution = monthlyPay * 0.07;
    cout << "7 percent is $" << contribution
         << " per month.\n";

    // Calculate and display a 10% contribution.
    contribution = monthlyPay * 0.1;
    cout << "10 percent is $" << contribution
         << " per month.\n";

    return 0;
}
```

2.

```cpp
#include <iostream>
using namespace std;

int main()
{
    // Variables to hold the regular price, the
    // amount of a discount, and the sale price.
    double regularPrice = 59.95, discount, salePrice;

    // Calculate the amount of a 20% discount.
    discount = regularPrice * 0.20;

    // Calculate the sale price by subtracting the
    // discount from the regular price.
    salePrice = regularPrice - discount;

    // Display the results.
    cout << "Regular price: $" << regularPrice << endl;
    cout << "Discount amount: $" << discount << endl;
    cout << "Sale price: $" << salePrice << endl;
    return 0;
}
```

3.

```cpp
#include <iostream>
using namespace std;

int main()
{
    int number = 12345;
    int rightMost = number % 10;

    cout << "The rightmost digit in "
         << number << " is "
         << rightMost << endl;

    return 0;
}
```

4.

```cpp
#include <iostream>
using namespace std;

int main()
{
    // The total seconds is 125.
    int totalSeconds = 125;

    // Variables for minutes and seconds
    int minutes, seconds;

    // Get the number of minutes.
    minutes = totalSeconds / 60;

    // Get the remaining seconds.
    seconds = totalSeconds % 60;

    // Display the results.
    cout << totalSeconds << " is equivalent to:\n";
    cout << "Minutes: " << minutes << endl;
    cout << "Seconds: " << seconds << endl;
    return 0;
}
```

5.

```cpp
#include <iostream>
using namespace std;

int main()
{
   int length, width, area;

   cout << "This program calculates the area of a ";
   cout << "rectangle.\n";
   cout << "Enter the length and width of the rectangle ";
   cout << "separated by a space.\n";
   cin >> length >> width;
   area = length * width;
   cout << "The area of the rectangle is " << area << endl;
   return 0;
}
```

6.

```cpp
#include <iostream>
using namespace std;

int main()
{
   double numerator, denominator;

   cout << "This program shows the decimal value of ";
   cout << "a fraction.\n";
   cout << "Enter the numerator: ";
   cin >> numerator;
   cout << "Enter the denominator: ";
   cin >> denominator;
   cout << "The decimal value is ";
   cout << (numerator / denominator) << endl;
   return 0;
}
```

7.

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
   const double PI = 3.14159;
   double area, radius;

   cout << "This program calculates the area of a circle.\n";
   cout << "What is the radius of the circle? ";
   cin >> radius;
   area = PI * pow(radius, 2.0);
   cout << "The area is " << area << endl;
   return 0;
}
```

8.

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
    double test1, test2, test3;  // To hold the scores
    double average;              // To hold the average

    // Get the three test scores.
    cout << "Enter the first test score: ";
    cin >> test1;
    cout << "Enter the second test score: ";
    cin >> test2;
    cout << "Enter the third test score: ";
    cin >> test3;

    average = (test1 + test2 + test3) / 3.0;

    cout << "The average score is: " << average << endl;
    return 0;
}
```

9.

```cpp
#include <iostream>
using namespace std;

int main()
{
   // testVar is initialized with the maximum value for a short.
   short testVar = 32767;

   // Display testVar.
   cout << testVar << endl;

   // Add 1 to testVar to make it overflow.
   testVar = testVar + 1;
   cout << testVar << endl;

   // Subtract 1 from testVar to make it underflow.
   testVar = testVar - 1;
   cout << testVar << endl;
   return 0;
}
```

10.

```cpp
#include <iostream>
using namespace std;

int main()
{
   float test;

   test = 2.0e38 * 1000;     // Should overflow test.
   cout << test << endl;
   test = 2.0e-38 / 2.0e38; // Should underflow test.
   cout << test << endl;
   return 0;
}
```

11.

```cpp
#include <iostream>
using namespace std;

int main()
{
   int books;         // Number of books to read
   int months;        // Number of months spent reading
   double perMonth;   // Average number of books per month

   cout << "How many books do you plan to read? ";
   cin >> books;
   cout << "How many months will it take you to read them? ";
   cin >> months;
   perMonth = static_cast<double>(books) / months;
   cout << "That is " << perMonth << " books per month.\n";
   return 0;
}
```

12.

```cpp
#include <iostream>
using namespace std;

int main()
{
    int number = 65;

    cout << number << endl;

    cout << static_cast<char>(number) << endl;
    return 0;
}
```

13.

```cpp
#include <iostream>
#include <iomanip>
using namespace std;

int main()
{
    int num1 = 2897, num2 = 5,    num3 = 837,
        num4 = 34,   num5 = 7,    num6 = 1623,
        num7 = 390,  num8 = 3456, num9 = 12;

    // Display the first row of numbers
    cout << setw(6) << num1 << setw(6)
         << num2 << setw(6) << num3 << endl;

    // Display the second row of numbers
    cout << setw(6) << num4 << setw(6)
         << num5 << setw(6) << num6 << endl;

    // Display the third row of numbers
    cout << setw(6) << num7 << setw(6)
         << num8 << setw(6) << num9 << endl;
    return 0;
}
```

14.

```cpp
#include <iostream>
#include <iomanip>
using namespace std;

int main()
{
    double quotient, number1 = 132.364, number2 = 26.91;

    quotient = number1 / number2;
    cout << quotient << endl;
    cout << setprecision(5) << quotient << endl;
    cout << setprecision(4) << quotient << endl;
    cout << setprecision(3) << quotient << endl;
    cout << setprecision(2) << quotient << endl;
    cout << setprecision(1) << quotient << endl;
    return 0;
}
```

15.

```cpp
#include <iostream>
#include <iomanip>
using namespace std;

int main()
{
   double day1, day2, day3, total;

   cout << "Enter the sales for day 1: ";
   cin >> day1;
   cout << "Enter the sales for day 2: ";
   cin >> day2;
   cout << "Enter the sales for day 3: ";
   cin >> day3;

   total = day1 + day2 + day3;

   cout << "\nSales Amounts\n";
   cout << "-------------\n";
   cout << setprecision(2) << fixed;
   cout << "Day 1: " << setw(8) << day1 << endl;
   cout << "Day 2: " << setw(8) << day2 << endl;
   cout << "Day 3: " << setw(8) << day3 << endl;
   cout << "Total: " << setw(8) << total << endl;
   return 0;
}
```

16.

```cpp
#include <iostream>
#include <string>
using namespace std;

int main()
{
    string name;
    string city;
    string ambition;
    string travelDest;

    cout << "Please enter your name: ";
    getline(cin, name);
    cout << "Enter the city you live in: ";
    getline(cin, city);
    cout << "What you want to be when you graduated? ";
    getline(cin, ambition);
    cout << "What country you want to go to travel? ";
    getline(cin, travelDest);

    cout << "Hello, " << name << ". ";
    cout << "You live in " << city << endl;
    cout << "For now, your ambition is to be: " << ambition << endl;
    cout << "Your travel destination country is: " << travelDest << endl;

    return 0;
}
```

17.

```cpp
#include<iostream>
using namespace std;

int main()
{
    char ch;

    cout << "Type a character and press Enter: ";
    cin >> ch;
    cout << "You entered " << ch << endl;
    return 0;
}
```

18.

```cpp
#include<iostream>
using namespace std;

int main()
{
    char ch;

    cout << "This program has paused. Press Enter to continue.";
    cin.get(ch);
    cout << "It has paused a second time. Please press Enter again.";
    ch = cin.get();
    cout << "It has paused a third time. Please press Enter again.";
    cin.get();
    cout << "Thank you!";
    return 0;
}
```

19.

```cpp
#include <iostream>
#include <iomanip>
#include <cmath>
using namespace std;

int main()
{
   double a, b, c;

   cout << "Enter the length of side a: ";
   cin >> a;
   cout << "Enter the length of side b: ";
   cin >> b;
   c = sqrt(pow(a, 2.0) + pow(b, 2.0));
   cout << "The length of the hypotenuse is ";
   cout << setprecision(2) << c << endl;
   return 0;
}
```

20.

```cpp
#include <iostream>
#include <cstdlib>   // rand and srand
#include <ctime>     // For the time function
using namespace std;

int main()
{
   // Get the system time.
   unsigned seed = time(0);

   // Seed the random number generator.
   srand(seed);

   // Display three random numbers.
   cout << rand() << endl;
   cout << rand() << endl;
   cout << rand() << endl;
   return 0;
}
```