Tutorial 41 - Multiple Inheritance in C++

Definition:

- **Multiple inheritance** allows a derived class to inherit from more than one base class.
- Example: A class `Programmer` inherits from both `Employee` and `Assistant`.

Syntax:

```
class Derived : visibility-mode Base1, visibility-mode Base2 {
    // Class body
};

```

Code Explanation

Code Snippet 1: Base Classes

```
class Base1 {
protected:
    int base1int;
public:
    void set_base1int(int a) {
        base1int = a;
    }
};
class Base2 {
protected:
    int base2int;
public:
    void set_base2int(int a) {
        base2int = a;
    }
};
class Base3 {
protected:
    int base3int;
public:
    void set_base3int(int a) {
        base3int = a;
    }
};

```

Key Points:

1. **Base1 Class**:
   - **Protected**: `base1int`.
   - Function: `set_base1int()` → Sets the value of `base1int`.
2. **Base2 Class**:
   - **Protected**: `base2int`.
   - Function: `set_base2int()` → Sets the value of `base2int`.

3. **Base3 Class**:
   - **Protected**: `base3int`.
   - Function: `set_base3int()` → Sets the value of `base3int`.

Code Snippet 2: Derived Class

```
class Derived : public Base1, public Base2, public Base3 {
public:
    void show() {
        cout << "The value of Base1 is " << base1int << endl;
        cout << "The value of Base2 is " << base2int << endl;
        cout << "The value of Base3 is " << base3int << endl;
        cout << "The sum of these values is " << base1int + base2int + base3int << endl;
    }
};

```

Key Points:

1. **Inherits**: `Base1`, `Base2`, and `Base3` in public mode.
2. Function: `show()`:
   - Prints values of `base1int`, `base2int`, `base3int`.
   - Calculates and prints the sum of the three values.

Code Snippet 3: Main Function

```
int main() {
    Derived harry;
    harry.set_base1int(25);
    harry.set_base2int(5);
    harry.set_base3int(15);
    harry.show();
    return 0;
}

```

Key Points:

1. Creates `Derived` object `harry`.
2. Calls:
   - `set_base1int(25)` → Sets `base1int` to 25.
   - `set_base2int(5)` → Sets `base2int` to 5.
   - `set_base3int(15)` → Sets `base3int` to 15.
   - `show()` → Displays the values and their sum.

Short Notes for Notebook

Multiple Inheritance:

1. A derived class inherits from more than one base class.
2. Syntax:

```
class Derived : visibility-mode Base1, visibility-mode Base2 {
```

```
    // Class body
};

```

Code Example:

1. **Base Classes**:
   - `Base1` → Protected: `base1int`, Function: `set_base1int()`.
   - `Base2` → Protected: `base2int`, Function: `set_base2int()`.
   - `Base3` → Protected: `base3int`, Function: `set_base3int()`.
2. **Derived Class**:
   - Inherits `Base1`, `Base2`, and `Base3`.
   - Public function `show()`:
     - Prints `base1int`, `base2int`, and `base3int`.
     - Calculates and prints their sum.
3. **Main Function**:
   - Create `Derived` object.
   - Call functions to set values.
   - Call `show()` to display results.

Output:

- Displays:
  - Values of `base1int`, `base2int`, `base3int`.
  - Sum of these values.