Object-Oriented Programming Using C++

Copy Constructor

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Copy Constructor

- The copy constructor is a constructor which creates an object by initializing it with an object of the same class, which has been created previously
- If a copy constructor is not defined in a class, the compiler itself defines one
- If the class has pointer variables and has some dynamic memory allocations, then it is a must to have a copy constructor

Example 1: Copy Constructor

Copy Constructor for the Line class

```
class Line {
   private:
      int *ptr;
   public:
      int getLength( void );
      Line( int len );             // simple constructor
      Line( const Line &obj);  // copy constructor
      ~Line();                     // destructor
};

// Member functions definitions including constructor
Line::Line(int len) {
   cout << "Normal constructor allocating ptr" << endl;
   ptr = new int;
   *ptr = len;
}

Line::Line(const Line &obj) {
   cout << "Copy constructor allocating ptr." << endl;
   ptr = new int;
   *ptr = *obj.ptr; // copy the value
}

Line::~Line(void) {
   cout << "Freeing memory!" << endl;
   delete ptr;
}
```

Example 1: Copy Constructor (Contd.)

Copy Constructor for the Line class

```
....

int Line::getLength( void ) {
   return *ptr;
}

void display(Line obj) {
   cout << "Length of line : " << obj.getLength() <<endl;
}

// Main function for the program
int main() {
   Line line(10);

   display(line);

   return 0;
}
```

Example1 : Copy Constructor

Output

```
Normal constructor allocating ptr
Copy constructor allocating ptr.
Length of line : 10
Freeing memory!
Freeing memory!
```

Example 2: Copy Constructor

Copy Constructor for the Line class

```
....

int Line::getLength( void ) {
   return *ptr;
}

void display(Line obj) {
   cout << "Length of line : " << obj.getLength() << endl;
}

// Main function for the program
int main() {

   Line line1(10);

   Line line2 = line1; // This also calls copy constructor

   display(line1);
   display(line2);

   return 0;
}
```

Example 2: Copy Constructor

Output

```
Normal constructor allocating ptr
Copy constructor allocating ptr.
Copy constructor allocating ptr.
Length of line : 10
Freeing memory!
Copy constructor allocating ptr.
Length of line : 10
Freeing memory!
Freeing memory!
Freeing memory!
```

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