Object-Oriented Programming Using C++
Friend Function

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Friend Function

- A friend function of a class is defined outside that class' scope but it has the right to access all private and protected members of the class

- Even though the prototypes for friend functions appear in the class definition, friends are not member functions

- A friend can be a class, in which case the entire class and all of its members are friends

- To declare a function as a friend of a class, precede the function prototype in the class definition with keyword friend

Friend Function

Friend frunction for the Box class

```
class Box {
    double width;

    public:
        double length;
        friend void printWidth( Box box );
        void setWidth( double wid );
};
```

Friend an entire class

```
friend class ClassTwo;
```

Example: Friend Function

Friend function for the Box class

```
class Box {
   double width;

   public:
      friend void printWidth( Box box );
      void setWidth( double wid );
};

// Member function definition
void Box::setWidth( double wid ) {
   width = wid;
}

// Note: printWidth() is not a member function of any class.
void printWidth( Box box ) {
   /* Because printWidth() is a friend of Box, it can
   directly access any member of this class */
   cout << "Width of box : " << box.width <<endl;
}

// Main function for the program
int main() {
   Box box;
   // set box width without member function
   box.setWidth(10.0);
   // Use friend function to print the width
   printWidth( box );
   return 0;
}
```

Example: Friend Class

Friend class LinkedList of the Node class

```
class Node {
private:
    int key;
    Node* next;
    /* Other members of Node Class */

    // Now class  LinkedList can access private members of Node
    friend class LinkedList;
};
```

Friend function of the Node class from the LinkedList class

```
class Node {
private:
    int key;
    Node* next;
    /* Other members of Node Class */

    // Only search() of linkedList can access internal members
    friend int LinkedList::search();
};
```

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