

Static Member Variables and Functions

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Static Member Variables & Functions

- Static Member Variables

- Normally – every object gets its own copy of each of its member variables

Circle obj1(5); objects radius value is 5

Circle obj2(10); objects radius value is 10

- Objects of the same type can all share static member variables

- Make the member variable static inside the class declaration
- Declare the static variable outside the class in the global area of the program

Static Member Variables & Functions

- Static Member Variables - example

```
/*
 * Circle3.h
 *
 * Created on: Mar 9, 2019
 * Author: johnsontimoj
 */
//
// class declaration for Circle3 class
// for ee2510 class notes
//
#ifndef CIRCLE3_H_
#define CIRCLE3_H_

class Circle3 {
// member data
private:
    double r;
public:
    static int circle_cnt;

// member functions
public:
    Circle3();
    void setRadius(double r);
    double getRadius(void);
}; // end Circle3 class

#endif /* CIRCLE3_H_ */
```

```
/*
 * Circle3.cpp
 *
 * Created on: Mar 9, 2019
 * Author: johnsontimoj
 */

#include "Circle3.h"

#define PI 3.14159

Circle3::Circle3() {
    r = 1;
    circle_cnt++;
    return;
}

void Circle3::setRadius(double r){
    this->r = r;
    return;
}

double Circle3::getRadius(void){
    return r;
}
```

Static Member Variables & Functions

- Static Member Variables - example

```
*
* static_ex.cpp
*
* Created on: Feb 27, 2019
* Author: johnsontimoj
*/

////////////////////////////////////
// program to show the static functionality
////////////////////////////////////

#include <iostream>
#include "Circle3.h"
using namespace std;

// declare and initialize the static variable
int Circle3::circle_cnt = 0;

int main(void){
    // Create some objects
    Circle3 obj1;
    cout << "Current num circles: " << obj1.circle_cnt << endl;
    Circle3 obj2;
    cout << "Current num circles: " << obj2.circle_cnt << endl;
    Circle3 obj3;
    cout << "Current num circles: " << obj3.circle_cnt << endl;
    cout << "Current num circles: " << obj2.circle_cnt << endl;
    cout << "Current num circles: " << obj1.circle_cnt << endl;

    system("pause");
    return 0;
}
```

```
class_notes.exe [C/C++ Application] D:\GDrive\
Current num circles: 1
Current num circles: 2
Current num circles: 3
Current num circles: 3
Current num circles: 3
Press any key to continue . . .
```

Static Member Variables & Functions

- Static Member Functions
 - Normally – functions that only access static member variables are also declared as static
 - These functions can be called independent of any specific object
 - Make the member function static inside the class declaration
 - Call the function separate from an instance of an object by using the reference notation
`ClassName::staticMemberFunction();`

Static Member Variables & Functions

- Static Member Function - example

```
*
 * Circle4.h
 *
 * Created on: Mar 9, 2019
 * Author: johnsontimoj
 */
//
// class declaration for Circle4 class
// for ee2510 class notes
//
#ifndef CIRCLE4_H_
#define CIRCLE4_H_

class Circle4 {
// member data
private:
    double r;
public:
    static int circle_cnt4;

// member functions
public:
    Circle4();
    void setRadius(double r);
    double getRadius(void);
    static int getCnt(void);
}; // end Circle4 class

#endif /* CIRCLE4_H_ */
```

```
/*
 * Circle4.cpp
 *
 * Created on: Mar 9, 2019
 * Author: johnsontimoj
 */

#include "Circle4.h"

#define PI 3.14159

Circle4::Circle4() {
    r = 1;
    circle_cnt4++;
return;
}

void Circle4::setRadius(double r){
    this->r = r;
return;
}

double Circle4::getRadius(void){
return r;
}

int Circle4::getCnt(void){
return circle_cnt4;
}
```

Static Member Variables & Functions

- Static Member Function - example

```
/*
 * static_ex2.cpp
 *
 * Created on: Feb 27, 2019
 * Author: johnsontimoj
 */

////////////////////////////////////
// program to show the static functionality
////////////////////////////////////
#include <iostream>
#include "Circle4.h"
using namespace std;

// declare and initialize the static variable
int Circle4::circle_cnt4 = 0;

int main(void){
    // Create some objects
    Circle4 obj1;
    cout << "Current num circles: " << obj1.circle_cnt4 << endl;
    cout << "Current num circles using static fn: " << Circle4::getCnt() << endl;
    Circle4 obj2;
    cout << "Current num circles: " << obj2.circle_cnt4 << endl;
    Circle4 obj3;
    cout << "Current num circles: " << obj3.circle_cnt4 << endl;
    cout << "Current num circles using static fn: " << Circle4::getCnt() << endl;

    system("pause");
    return 0;
}
```

```
<terminated> (exit value: 0) class_notes.exe [C/C++ App]
Current num circles: 1
Current num circles using static fn: 1
Current num circles: 2
Current num circles: 3
Current num circles using static fn: 3
Press any key to continue . . .
```