

Variable Scope and Lifetime

```
int my_global_variable = 7; // file scope, program lifetime

int f(void)
{
    int my_local_variable = 11; // block scope, function lifetime
    //...
}
```

Scope

where can you access it

Lifetime

for how long can it retain its value

Examples – Local and Global

Local variable

```
int foo(int x){  
    int aLocalVar;  
    aLocalVar = 7;  
    {  
        // nested block  
        int aLocalVar = 4;  
    }  
    x = x + aLocalVar;  
    return (x);  
}
```

scope : local to function

lifetime : duration of function

Global variable

```
int GlobalVarX = 10;  
int GlobalVarY;  
  
int main(){  
    GlobalVarY = GlovalVarX;  
    foo();  
    printf("%d\n", GlobalVarY);  
}  
  
void foo() {  
    GlobalVarY = -1;  
}
```

scope : entire program

lifetime : entire program

Examples – Static File and Function

Static file variable

```
static int someStaticLocal;  
int foo() {  
    someStaticLocal++;  
    return(someStaticLocal);  
}  
void foo2() {  
    someStaticLocal=5;  
    printf("%d\n", someStaticLocal);  
    foo();  
    printf("%d\n", someStaticLocal);  
}
```

scope : file

lifetime : entire program

Static local variable

```
int foo() {  
    static int staticVarX = 0;  
    staticVarX++;  
    return(staticVarX);  
}  
  
int main() {  
    printf("%d\n", foo());  
    printf("%d\n", foo());  
}
```

scope : function

lifetime : entire program