



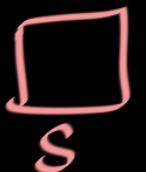
Homework Extern Keyword

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Question 1

```
extern int s;  
int t;  
static int u;  
main()  
{  
}
```

doesn't give you memory



file2.c

Can you use 's' in
another file? \Rightarrow No.

Assume that above program compiles and runs successfully. Which of s, t and u are available to a function present in another file?

- a) Only s
- b) Only t
- c) s and t
- d) s, t and u

```
extern int s;  
int t;  
static int u;  
main()  
{  
}
```

You have just
run successfully
this file , it run successfully
Now if i want to use 's'
in another file then can i use it?

assume this file , it run successfully

Question 2

```
#include<stdio.h>
int main()
{
    extern int a;
    static char j = 'E';
    printf("%c %d", ++j, ++a);
    return 0;
}
```

No compiler issue.

linker will not be able
to link this as

- A. Linker error
- B. Compile error
- C. Run time error
- D. No error



Question 3

```
#include<stdio.h>
int main()
{
extern int i;
printf("%d", i);
return 0;
}
int i=100;
```



- a) garbage
- b) 0
- c) 100
- d) Compilation error



C Programming

#include<stdio.h>
int main()
{
 ~~int i=100;~~
 printf("%d", i);
 return 0;
}
int i=100;

what is i?

G
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- a) garbage
- b) 0
- c) 100
- d) Compilation error



C Programming

#include<stdio.h>
int main()
{
extern int i;
printf("%d", i);
i = 50;
return 0;
}
int i=100;

- a) garbage
- b) *50*
- c) 100
- d) Compilation error



Question 4

What will be output of the program on execution? (If error then specify type of error)

```
#include<stdio.h>
extern int i;
int i = 10;
int main() {
    printf("%d", i);
    return 0;
}
```





C Programming

Question 4

What will be output of the program on execution? (If error then specify type of error)

```
#include<stdio.h>

int i = 10;
int main() {
    printf("%d", i);
    return 0;
}
```



(There was no benefit of extern
in this program)



Question 5

What will be output of the program on execution? (If error then specify type of error)

```
#include<stdio.h>
extern int i;
extern int i;
int i = 10;
{i=5; ----->
int main() {
    printf("%d", i);
    return 0;
}
```



Strange
(this is compile
time error)

You can not write anything other than declaration
or defn outside functions.

```
void fun( void );
void fun (void);
main()
{
}
```



C Programming

Question 5

What will be output of the program on execution? (If error then specify type of error)

```
#include<stdio.h>
int i;
int i;
int i = 10;
i=5;
int main() {

    printf("%d", i);
    return 0;
}
```



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```
#include <stdio.h>
int i;
int main()
{
    extern int i;
    printf("%d ", i);

    {
        int i = 10;
        printf("%d ", i);
    }
}
```

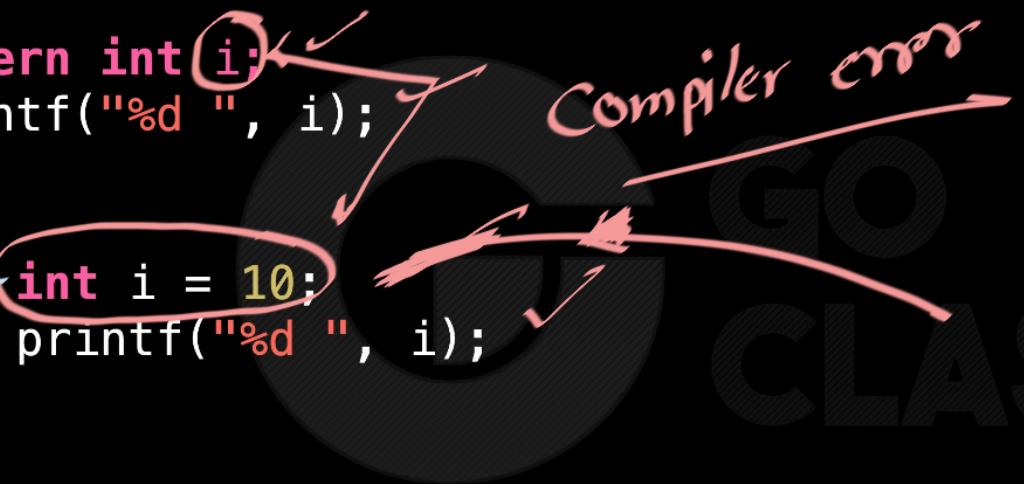
Question 6

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- (a) 0 10
- (b) Compiler Error
- (c) 0 0
- (d) 10 10

```
#include <stdio.h>
int i;
int main()
{
    extern int i;
    printf("%d ", i);
    int i = 10;
    printf("%d ", i);
}
```

Question 6



- (a) 0 10
- (b) Compiler Error
- (c) 0 0
- (d) 10 10

```
#include <stdio.h>
int i;
int main()
{
    int i = 10;
    extern int(i);
    printf("%d ", i);
    printf("%d ", i);
}
```

Question 6

Compiler error

- (a) 0 10
- (b) Compiler Error
- (c) 0 0
- (d) 10 10



```
#include<stdio.h>
extern int i;
int main()
{
    int i=10;
    printf("%d", i);
}
```

No error
Output: 10



Question 7

C skip)

```
#include<stdio.h>
extern int i;
int main()
{
    printf("%d",i);
    int i=10;
}
```

What will be output of the program on execution? (If error then specify type of error)

- a) garbage
- b) 0
- c) 100
- d) Compilation error



Question 8

```
#include<stdio.h>
void fun(){
    extern int i;
    i++;
}
int main()
{
    fun();
    extern int i;
    i++;
    printf("%d",i);
}
int i;
```

Options:

- A. 1
- B. 0
- C. 2
- D. Compiler error
- E. Linker Error



C Programming

Question 8

```
#include<stdio.h>
void fun(){
    extern int i;
    i++;
}
int main()
{
    fun();
    i++;
    printf("%d",i);
}
int i;
```

Options:

- A. 1
- B. 0
- C. 2
- D. Compiler error
- E. Linker Error



C Programming

```
#include<stdio.h>
extern int i;

void fun(){
    i++;
}

int main()
{
    fun();
    i++;
    printf("%d", i);
}

int i;
```

Question 8

Options:

- A. 1
- B. 0
- C. 2
- D. Compiler error
- E. Linker Error

Question 9

X Y
 J

120

final Answer

```
#include<stdio.h>

int g(int i)
{
    static int Y = 0;
    Y = Y + i;
    return Y;
}

int f(int i)
{
    static int X = 0;
    X = X + i;
    X = g(X);
    return X;
}
```

```
int main(){
    int i, j;
    for (i = 0; i <= 6; i++)
        j = f(i);

    printf("%d\n", j);
    return 0;
}
```

0 j= 0
 1 j= 1
 2 j= 4
 3
 4
 5
 6

120
 347

The value printed by the above program is ?



Question 10 (Bonus)

Given these three files, if we compile and link them, what will be the resulting output when we run the program?

- A. 0
- B. 1
- C. 2
- D. A linking error will occur.

filea.c

```
extern int i;  
  
void f(void) {  
    i++;  
}
```

main.c

```
#include <stdio.h>  
extern int i;  
  
void f(void);  
void g(void);  
  
int main()  
{  
    f();  
    g();  
    printf("%d", i);  
}
```

fileb.c

```
int i = 0;  
void f(void);  
void g(void) {  
    f();  
}
```

```
extern int i;  
  
void f(void) {  
    i++;  
}  
  
int i = 0;  
void f(void);  
void g(void) {  
    f();  
}
```

```
#include <stdio.h>  
extern int i;  
void f(void);  
void g(void);  
  
int main()  
{  
    f();  
    g();  
    printf("%d", i);  
}
```



extern with Functions



By default

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functions are
extern.

void fun(void); ≡ extern void fun(void);



Crux of this topic

extern
is optional

```
Void fun(Void);  
main ()  
{ fun(); }  
file
```

```
void fun(void)  
{ pf ("Hello")  
}
```

main

Declaration and Definition

↓

(extern) void fun (void);

↑ optional

void fun (void)
{
 pf ("hello");
}



Declaration and Definition

↓

(extern) void fun (void);

optional

extern int i;

void fun (void)

{

pf ("hello");

}

int i=s;

Declaration and Definition

↓

(extern) void fun (void);

↑
optional

extern int i;

void fun (void)
{
 pf ("hello");
}
int i = 5;

extern int i = 10; ← allowed but rare.

← Not allowed locally.

Declaration and Definition



(extern) void fun (void);

↑
optional

extern int i;

void fun (void)

{

pf ("Hello");
int i=5;

(optional)
extern

void

fun (void)

{

pf ("Hello");

}

but only globally.

extern int i = 10; ← allowed but rare.

↑ Not allowed locally.



```
main( )
```

```
{
```

```
extern int i=10; j
```

```
}
```

↑
compiler error

```
main( )
```

```
GO
```

```
CLASSES
```

```
void fun(void)
```

```
{ pf("Hello"); }
```

```
}
```

↑
compiler error



functions are not allowed to
define inside any other function.

G GO
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```
main( )
```

```
{
```

```
void fun (void);
```

```
    fun();
```

```
}
```

```
void fun (void)
```

```
{
```

```
    pf ("hello");
```

```
}
```

No error



```
void fun (void);
```

```
main( )
```

```
{  
    fun();  
}
```

```
void fun (void)  
{  
    pf ("hello");  
}
```

No error



```
main( )  
{  
    void fun( void );  
    func();  
}
```

void g() {
 func();
}
compiler error

```
void fun( void )  
{  
    pf ("hello");  
}
```



```
void fun (void);  
main ( )  
{  
    fun();  
}
```

```
void g ( ) {  
    fun();  
}
```

No error

```
void fun (void)  
{  
    pf ("hello");  
}
```

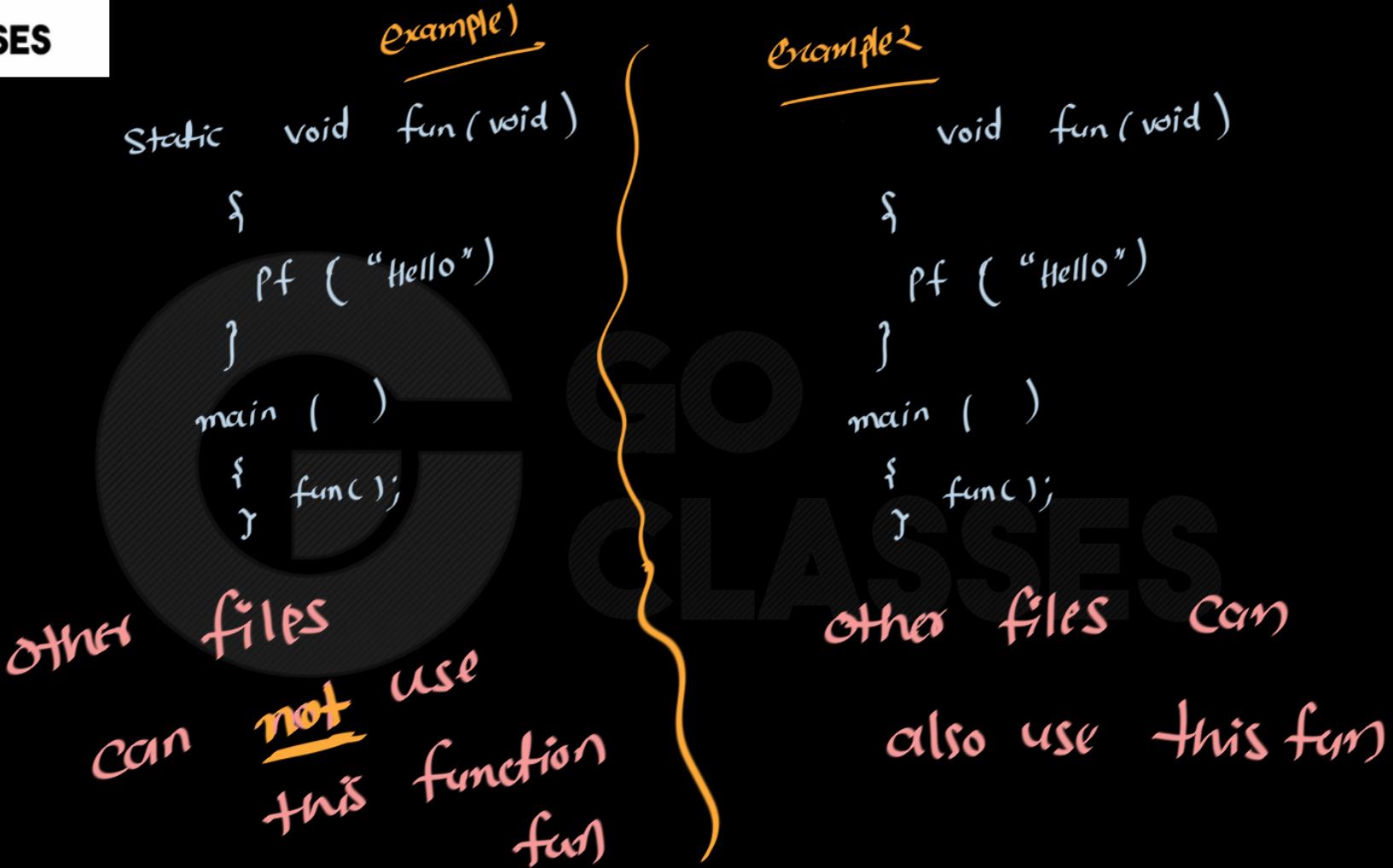


Example 1

```
static void fun( void )  
{  
    pf ( "Hello" )  
}  
main ( )  
{  
    fun();  
}
```

Example 2

```
void fun( void )  
{  
    pf ( "Hello" )  
}  
main ( )  
{  
    fun();  
}
```





C Code	Decl/Def	Linkage	Comment
int f1 (int);	1	2	
extern int f2 (int);	1	2	
static int f3 (int);	1	1	
int f4 (int i) { ... }	2	2	
extern int f5 (int i) { ... }	2	2	
static int f6 (int i) { ... }	2	1	

Note: Somewhat rare to use “extern” keyword with function declaration or definition – because “extern” is the default.

C Code	Decl/Def	Linkage	Comment
int f1 (int);	declaration	external	Common
extern int f2 (int);	declaration	external	Rare (but see lecture notes)
static int f3 (int);	declaration	internal; f3 must be defined in same compilation unit	
int f4 (int i) { ... }	definition	external	Common
extern int f5 (int i) { ... }	definition	external	Rare
static int f6 (int i) { ... }	definition	internal	Common

Note: Somewhat rare to use “extern” keyword with function declaration or definition – because “extern” is the default.