

# Storage Classes and Memory Layout in C

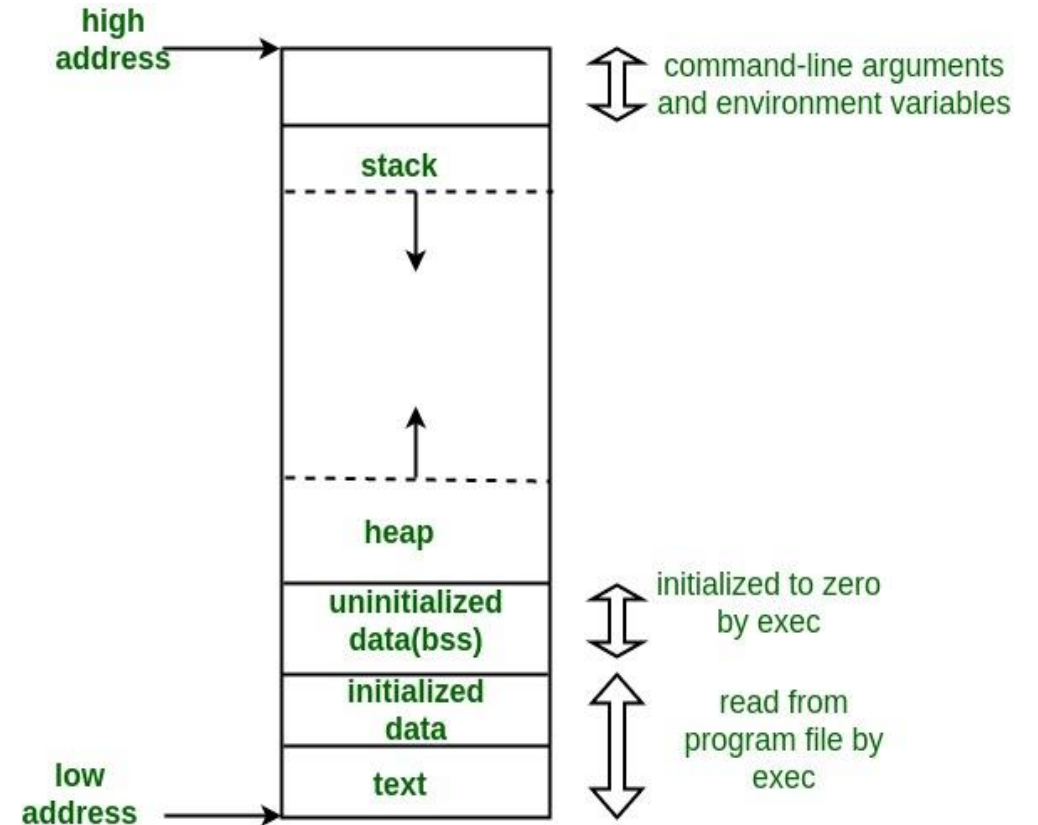
A quick demonstration guide

-Mitali Desai

# Storage Classes

## Storage classes in C

Storage Specifier	Storage	Initial value	Scope	Life
auto	stack	Garbage	Within block	End of block
extern	Data segment	Zero	global Multiple files	Till end of program
static	Data segment	Zero	Within block	Till end of program
register	CPU Register	Garbage	Within block	End of block



Activities Terminal Wed 22:50 memory.c ~/Desktop Save

```
#include <stdio.h>
int x;
void autoStorageClass()
{
    printf("\nDemonstrating auto class\n\n");
    auto int a = 32;
    printf("%d\n", a);
}
void registerStorageClass()
{
    register char b = 'G';
    printf("\nDemonstrating register class\n\n");
    printf("%d\n", b);
}
void externStorageClass()
{
    printf("\nDemonstrating extern class\n\n");
    extern int x;
    printf("%d\n", x);
    x = 2;
    printf("%d\n", x);
}
void staticStorageClass()
{
    int i = 0;
    printf("\nDemonstrating static class\n\n");
    for (i = 1; i < 5; i++) {
        static int y = 5;
        int p = 10;
        y++;
        p++;
        printf("%d %d\n", i, y);
        printf("%d %d\n", i, p);
    }
}
int main()
{
    autoStorageClass();
    registerStorageClass();
    externStorageClass();
    staticStorageClass();
    printf("\n\nStorage Classes demonstrated");
    return 0;
}
```

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```
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mitali@mitali-G3-3579:~/Desktop$ gcc memory.c
mitali@mitali-G3-3579:~/Desktop$ ./a.out

Demonstrating auto class

32

Demonstrating register class

71

Demonstrating extern class


0
2

Demonstrating static class

1 6
1 11
2 7
2 11
3 8
3 11
4 9
4 11

Storage Classes demonstratedmitali@mitali-G3-3579:~/Desktop$
```

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Open mm.c  
~/Desktop

Save



```
int main(void)
{
    return 0;
}
```

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```
mitali@mitali-G3-3579:~/Desktop$ gcc mm.c -o mm
mitali@mitali-G3-3579:~/Desktop$ size mm
   text    data     bss     dec      hex filename
   1415     544        8    1967     7af mm
mitali@mitali-G3-3579:~/Desktop$
```



Activities Terminal Wed 23:16

Open

```
#include <stdio.h>
int global; /* Uninitialized variable stored in bss*/
int main(void)
{
    static int i; /* Uninitialized static variable stored in bss */
    return 0;
}
```

mm.c  
~/Desktop

mitali@mitali-G3-3579: ~/Desktop

File Edit View Search Terminal Help

```
mitali@mitali-G3-3579:~/Desktop$ gcc mm.c -o mm
mitali@mitali-G3-3579:~/Desktop$ size mm
   text    data     bss     dec     hex filename
   1415     544         8    1967     7af mm
mitali@mitali-G3-3579:~/Desktop$ gcc mm.c -o mm
mitali@mitali-G3-3579:~/Desktop$ size mm
   text    data     bss     dec     hex filename
   1415     544     16      1975     7b7 mm
mitali@mitali-G3-3579:~/Desktop$
```

Save

C Tab Width: 8 Ln 9, Col 1 INS

ActivitiesTerminal

Open

mm.c  
~/Desktop

Save

```
#include <stdio.h>
int global = 10; /* initialized global variable stored in DS*/
int main(void)
{
    static int i = 100; /* Initialized static variable stored in DS*/
    return 0;
}
```

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File Edit View Search Terminal Help

mitali@mitali-G3-3579:~/Desktop\$ gcc mm.c -o mm

mitali@mitali-G3-3579:~/Desktop\$ size mm

text	data	bss	dec	hex	filename
1415	544	8	1967	7af	mm

mitali@mitali-G3-3579:~/Desktop\$ gcc mm.c -o mm

mitali@mitali-G3-3579:~/Desktop\$ size mm

text	data	bss	dec	hex	filename
1415	544	16	1975	7b7	mm

mitali@mitali-G3-3579:~/Desktop\$ gcc mm.c -o mm

mitali@mitali-G3-3579:~/Desktop\$ size mm

text	data	bss	dec	hex	filename
1415	552	8	1975	7b7	mm

mitali@mitali-G3-3579:~/Desktop\$

C Tab Width: 8 Ln 9, Col 1 INS