

C Programming

Day08.B

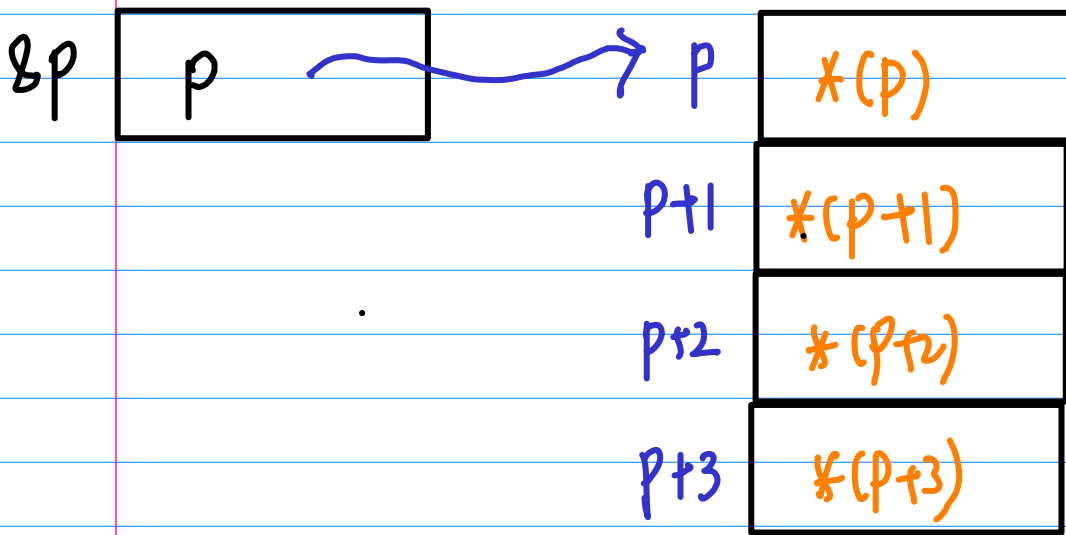
2017.10.14

for loop
functions

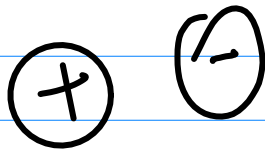
storage class,
scope,
linkage

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p : pointer var



$$*(p) \Leftrightarrow p[0]$$

$$*(p+1) \Leftrightarrow p[1]$$

$$*(p+2) \Leftrightarrow p[2]$$

$$*(p+3) \Leftrightarrow p[3]$$

array

```
#include <stdio.h>
```

```
int main( void ) {
```

```
    int i;
```

```
    char *p = "Hello!";
```

```
    printf("p = %s \n", p);
```

```
    printf("*p = %c \n", *p);
```

```
    printf(" p = %p \n", p);
```

```
    printf("&p = %p \n", &p);
```

```
    printf("-----\n");
```

```
    printf("(p+0) = %c \n", *(p+0) );
```

```
    printf("(p+1) = %c \n", *(p+1) );
```

```
    printf("(p+2) = %c \n", *(p+2) );
```

```
    printf("(p+3) = %c \n", *(p+3) );
```

```
    printf("(p+4) = %c \n", *(p+4) );
```

```
    printf("(p+5) = %c \n", *(p+5) );
```

```
    printf("(p+6) = %c \n", *(p+6) );
```

```
    printf("-----\n");
```

```
    for (i=0; i<7; ++i)
```

```
        printf("(p+%d) = %c \n", i, *(p+i) );
```

```
    printf("-----\n");
```

```
    printf("p[0] = %c \n", p[0] );
```

```
    printf("p[1] = %c \n", p[1] );
```

```
    printf("p[2] = %c \n", p[2] );
```

```
    printf("p[3] = %c \n", p[3] );
```

```
    printf("p[4] = %c \n", p[4] );
```

```
    printf("p[5] = %c \n", p[5] );
```

```
    printf("p[6] = %c \n", p[6] );
```

```
    printf("-----\n");
```

```
    for (i=0; i<7; ++i)
```

```
        printf("p[%d] = %c \n", i, p[i] );
```

```
}
```

local variable i,j,k

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void func() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
    {  
        int j = 222;  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
        {  
            int k = 333;  
            printf("3.i= %d\n", i);  
            printf("3.j= %d\n", j);  
            printf("3.k= %d\n", k);  
        }  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
    }  
}
```

local variable i's scope

```
guest-tb5s9t@CLASS ~
File Edit View Search Terminal Help
#include <stdio.h>

void func() {
  int i = 111;
  printf("1.i= %d\n", i);

  {
    int j = 222;
    printf("2.i= %d\n", i);
    printf("2.j= %d\n", j);

    {
      int k = 333;
      printf("3.i= %d\n", i);
      printf("3.j= %d\n", j);
      printf("3.k= %d\n", k);
    }

    printf("2.i= %d\n", i);
    printf("2.j= %d\n", j);
  }
}
```

local variable j's scope

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void func() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
  
    {  
        int j = 222;  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
  
        {  
            int k = 333;  
            printf("3.i= %d\n", i);  
            printf("3.j= %d\n", j);  
            printf("3.k= %d\n", k);  
        }  
  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
    }  
}
```

local variable k's scope

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void func() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
  
    {  
        int j = 222;  
  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
  
        {  
            int k = 333;  
  
            printf("3.i= %d\n", i);  
            printf("3.j= %d\n", j);  
            printf("3.k= %d\n", k);  
        }  
  
        printf("2.i= %d\n", i);  
        printf("2.j= %d\n", j);  
    }  
}
```



```
#include <stdio.h>
```

```
void tunc() {  
    int i = 111;  
    printf("1.i= %d\n", i);
```

```
{  
    int i = 222;  
    printf("2.i= %d\n", i);
```

```
{  
    int i = 333;  
    printf("3.i= %d\n", i);  
}
```

```
    printf("2.i= %d\n", i);
```

```
}
```

```
    printf("1.i= %d\n", i);
```

```
"t.c" 31 lines, 308 characters
```

1st i's scope

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void func1() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
  
    {  
        int i = 222;  
        printf("2.i= %d\n", i);  
  
        {  
            int i = 333;  
            printf("3.i= %d\n", i);  
        }  
  
        printf("2.i= %d\n", i);  
    }  
  
    printf("1.i= %d\n", i);  
}
```

1st i's scope
2nd i's scope

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void tunc() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
  
    {  
        int i = 222;  
        printf("2.i= %d\n", i);  
  
        {  
            int i = 333;  
            printf("3.i= %d\n", i);  
        }  
  
        printf("2.i= %d\n", i);  
    }  
  
    printf("1.i= %d\n", i);  
}
```

31 lines, 308 characters

1st i's scope
2nd i's scope
3rd i's scope

```
guest-tb5s9t@CLASS ~  
File Edit View Search Terminal Help  
#include <stdio.h>  
  
void tunc() {  
    int i = 111;  
    printf("1.i= %d\n", i);  
  
    {  
        int i = 222;  
        printf("2.i= %d\n", i);  
  
        {  
            int i = 333;  
            printf("3.i= %d\n", i);  
        }  
  
        printf("2.i= %d\n", i);  
    }  
  
    printf("1.i= %d\n", i);  
}
```

31 lines, 508 characters

t1.c

```
#include <stdio.h>

int a;

void func1(void) {
    puts("func1 is called");
}

void func3(void) ;

int main(void) {
    printf("a= %d\n", a);

    func1();
    // func2();
    func3();
}
```

gcc -c t1.c

=> t1.o

t2.c

```
#include <stdio.h>

int a = 333;

static void func2(void) {
    puts("func2 is called");
}

void func3(void) {
    printf("func3: ");
    func2();
}
```

gcc -c t2.c

=> t2.o

t1.c

t2.c

compile

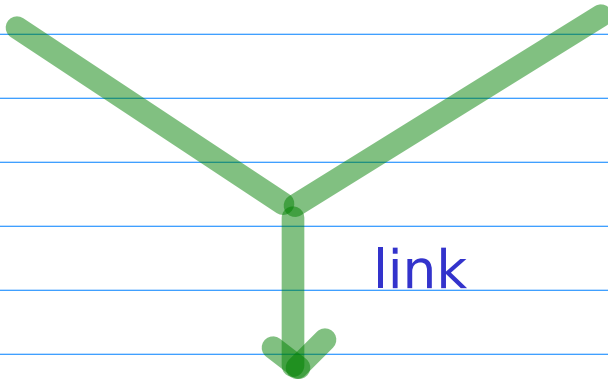
compile

t1.o

t2.o

link

a.out



t2.c

```
#include <stdio.h>

int a = 333;

static void func2(void) {
    puts("func2 is called");
}

void func3(void) {
    printf("func3: ");
    func2();
}
```

func2 has an internal linkage

thus, it cannot be called in main()
which is defined in t1.c

but func3 has an external linkage

and it is called in main()

func2 cannot be called by main() in t1.c
but can be called by func3() in t2.c

func2 is known only in t2.c
because of the static keyword

static storage class example

```
#include <stdio.h>

void func() {
    static int i = 0;

    printf("i= %d\n", i);
    i++;
}

int main(void) {

    func();
    func();
    func();
    func();
}
```

local variable --> automatic storage

static local variable --> static storage