

# **| Basic and Practice in Programming**

## **Lab 10**

# File (1/4)

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- File management in C language
  - FILE data type (strictly, data structure in C library)
  - Three operational modes
    - Read/Write/Append

```
struct FILE *fp;
```

```
fp = fopen(path, mode);
```

- fopen
  - A library function for opening the file
  - Read(r) : open file as “Read-Only”
  - Write(w) : open file as “Write-Only”
  - Append(a) : open file as “Appendable”

# File (2/4)

---

```
/* Practice 1 : File open - write */  
  
int main(void)  
{  
    FILE *fp;  
  
    fp = fopen("test", "w");  
  
    fprintf(fp, "Practice1");  
  
    fclose(fp);  
  
    return 0;  
}
```

**Open file "test" with Write-only mode**

**Close the file "test"**

# File (3/4)

```
/* Practice 2 : File open - read*/

int main(void)
{
    FILE *fp;
    char str[20];

    fp = fopen("test", "r");

    fscanf(fp, "%s", str);
    fprintf(stdout, "%s\n", str);

    fclose(fp);

    return 0;
}
```

**Open a file "test" with Read-only mode**

**Close the file "test"**

# File (4/4)

```
/* Practice 3 : File open - append*/
```

```
int main(void)
```

```
{
```

```
FILE *fp;
```

```
char str[20];
```

```
fp = fopen("test", "a");
```

```
sprintf(str, "file open\n");
```

```
fprintf(fp, "%s\n", str);
```

```
fclose(fp);
```

```
return 0;
```

```
}
```

**Open a file "test" with Appendable mode**

**Close the file "test"**

**File can be opened with other mode**  
fopen(path, "rw");

# Input/Output Operations (1/5)

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- C language provides functions for input/output
  - scanf/printf/
  - fscanf/fprintf
  - sscanf/sprintf
  - getchar/putchar
  - getc/putc
  - fgetc/fputc
  - ...

# Input/Output Operations (2/5)

---

- Standard input/output
  - stdin : keyboard
  - stdout : monitor screen
  - stderr : monitor screen
- Scanf/printf as wrapper function

```
scanf("%d", &a) == fscanf(stdin, "%d", &a);
```

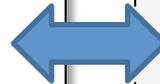
```
printf("%d", a) == fprintf(stdout, "%d", a);
```

# Input/Output Operations (3/5)

```
/* Practice 4 : fscanf/fprintf*/  
  
int main(void)  
{  
    int a;  
  
    fscanf(stdin, "%d", &a);  
    fprintf(stdout, "%d\n", a);  
  
    return 0;  
}
```

```
/* Practice 2 : File open - read*/
```

```
int main(void)  
{  
    FILE *fp;  
    char str[20];  
  
    fp = fopen("test", "r");  
  
    fscanf(fp, "%s", str);  
    fprintf(stdout, "%s\n", str);  
  
    fclose(fp);  
  
    return 0;  
}
```



FILE is input/output stream from/to file

# Input/Output Operations (4/5)

```
/* Practice 5 : fgetc*/
```

```
int main(void)
{
    char a;

    a = fgetc(stdin);
    fputc(a, stdout);
    fputc('\n', stdout);

    return 0;
}
```

**fgetc(stdin) == getc(stdin) == getchar()**

**fputc(c, stdout) == putc(c, stdout) == putchar(c)**

# Input/Output Operations (5/5)

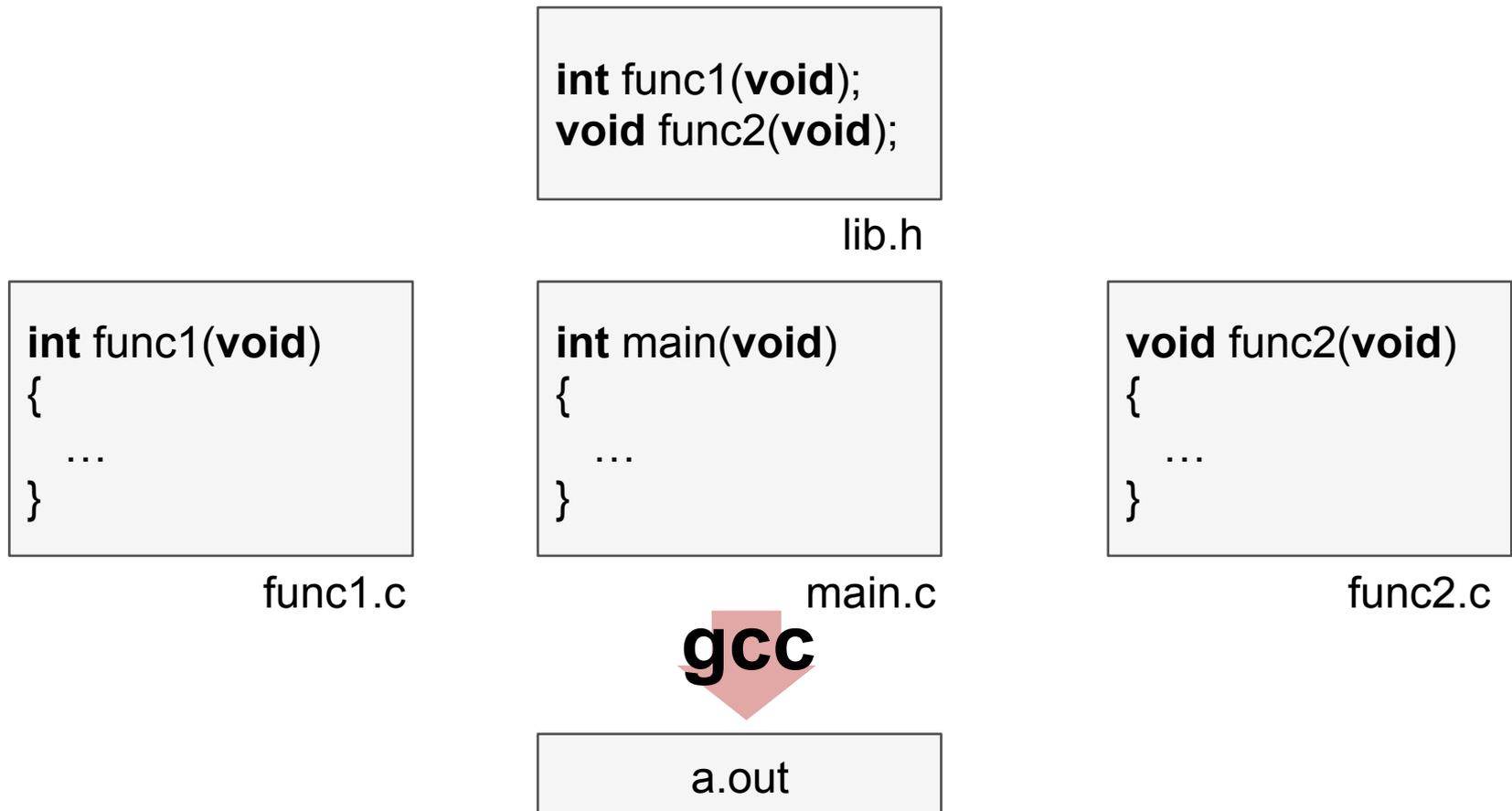
- Let's make a wrapper function
  - Using macro

```
/* Practice 6 : wrapper function*/  
  
#define myprintf(fmt, str) fprintf(stdout, fmt, str)  
  
int main(void)  
{  
    char *str = "wrapper function";  
    myprintf("%s\n", str);  
  
    return 0;  
}
```

**Handled by preprocessor**

# Compile Many Files (1/2)

- Code can be written into many files



# Compile Many Files (2/2)

```
void func1(void);
void func2(void);

                                prac7_lib.h
```

```
/* practice 7 : Many files */
#include "prac7_lib.h"
```

```
int main(void)
{
    func1();
    func2();

    return 0;
}

                                prac7_main.c
```

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

```
void func1(void)
{
    printf("func1!\n");
}

                                prac7_func1.c
```

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

```
void func2(void)
{
    printf("func2!\n");
}

                                prac7_func2.c
```

```
$gcc prac7_main.c prac7_func1.c prac7_func2.c -o prac7
```

# Static Variable (revisit)

- Keyword “static”
  - Once initialize, never again

```
void func1(void);  
void func2(void);
```

```
/* practice 8 : static variable */  
int main(void)  
{  
    int i = 0;  
    for (i = 0; i < 10; i++) {  
        func1();  
        func2();  
    }  
    return 0;  
}
```

```
#include <stdio.h>  
  
void func 1(void)  
{  
    int a = 0;  
    printf(“func1 %d\n”, a);  
    a++;  
}
```

```
#include <stdio.h>  
  
void func 2(void)  
{  
    static int a = 0;  
    printf(“func2 %d\n”, a);  
    a++;  
}
```

# Extern Variable (1/3)

- How to use external variables
  - Using keyword “extern”

```
/* practice 9 : extern variable 1*/  
  
int main(void)  
{  
    printf(“%d\n”, ext_val);  
}
```

prac9.c

```
int ext_val = 12;
```

prac9\_sub.c

```
$gcc prac9.c prac9_sub.c -o prac9
```

**Compile error occurred! Why?**

# Extern Variable (2/3)

- How to use external variables
  - Using keyword “extern”

```
/* practice 10 : extern variable 2*/  
extern int ext_val;  
  
int main(void)  
{  
    printf(“%d\n”, ext_val);  
}
```

prac10.c

```
int ext_val = 12;
```

prac10\_sub.c

# Extern Variable (3/3)

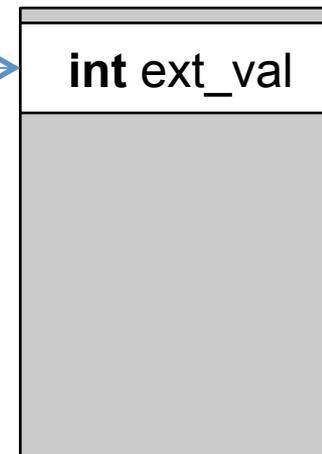
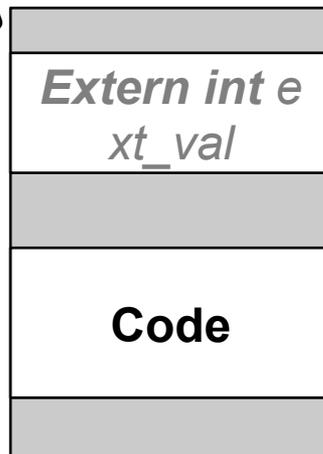
```
/* practice 10 : extern variable 2*/  
extern int ext_val;  
  
int main(void)  
{  
    printf("%d\n", ext_val);  
}
```

```
int ext_val = 12;
```

prac10\_sub.c

Empty slot

prac10.c



# Dip Dive in C

---

- Function pointer

```
/* practice 11 : function pointer*/  
  
void add (int a, int b)  
{  
    printf("add : %d\n", a + b);  
}  
  
void sub (int a, int b)  
{  
    printf("sub : %d\n", a - b);  
}
```

```
int main(void)  
{  
    void (*func) (int, int);  
  
    func = add;  
    func (3, 2);  
  
    func = sub;  
    func (3, 2);  
  
    return 0;  
}
```

# Dip Dive in C

---

- Command-line arguments

```
/* practice 12 : cmd-line args*/

int main (int argc, char *argv[])
{
    if (argc > 1)
        printf ("%s %s\n", argv[0], argv[1])
    else
        printf ("Error: at least, 1 argument is required\n");

    return 0;
}
```

# More Dip Dive in C

---

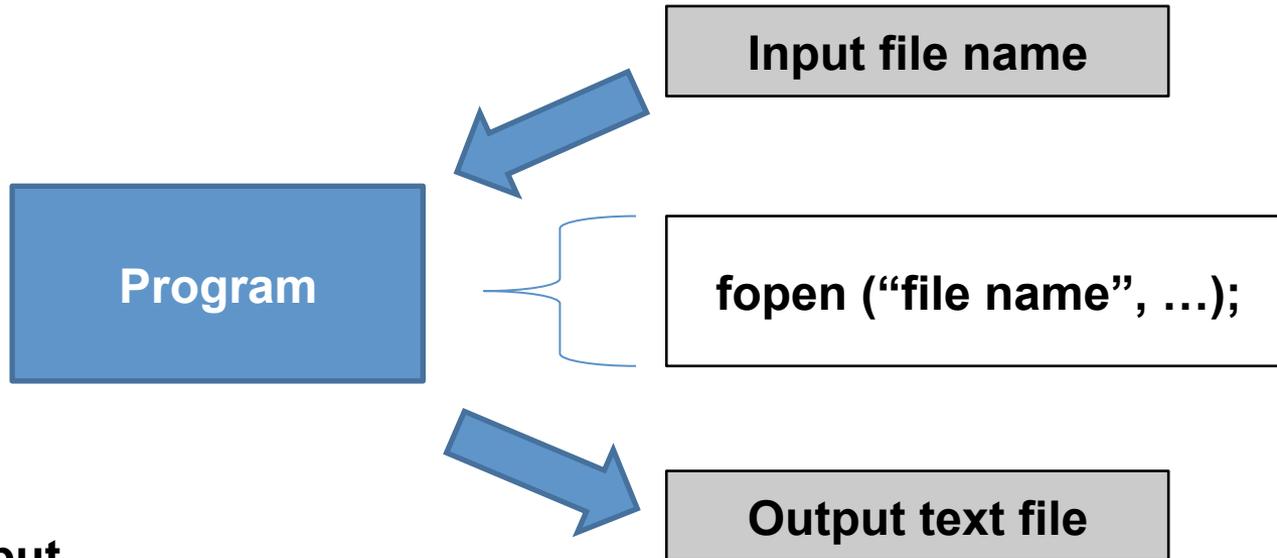
- Void \* (void pointer)
- Recursive call
- System call (fork/read/write...)
- Pre-processor

# Exercise

---

- White space remover
  - Input : text file name
  - Output : White space removed text file
  - White space including '\t', '\n', ' '
    - You should remove all of white space
  - Using fopen function
    - File name is given by command-line arguments

# Exercise



## Sample input

```
$/a.out loststars.txt
```

## loststars.txt

```
Please, don't see  
Just a boy caught up in dreams  
And fantasies
```

## Sample output

```
Please, don't see Just a boy caught up in  
dreams And fantasies
```