

# Command Line Argument

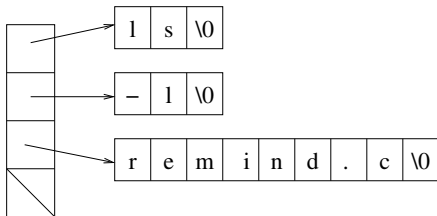
## Parameter List in Main

- Sometime additional information (switch) may have to be supplied to program.
- Eg. `ls -l` uses parameter `l` for changing its default behavior.
- Similarly, `ls -l remind.c` uses parameters `l` and `remind.c` to change its default behavior.
- To access command line information in function `main` two parameters are added: `int main(int argc, char *argv[])`
- `argc`: argument count.
- `argv[0]`: is the name of the program
- `argv[1] ... argv[argc-1]`: are different switches to program.

# Command Line Argument

## Parameter List in Main

- For eg., `ls -l reminder.c`, has argument count 3.
- `argv[0]` points to string `ls`
- `argv[1]` points to string `-l`
- `argv[2]` points to string `reminder.c`
- `argv[3]` is NULL



# Command Line Argument

## Example

```
#include <stdio.h>
#include <string.h>
#define NPLANETS 9
int main(int argc, char * argv[]) {
    char *planets[] = {"Mercury", "Venus", "Earth",
                       "Mars", "Jupiter", "Saturn",
                       "Uranus", "Neptune", "Pluto"};

    int i, j;

    /** Remaining part of the code **/
}
```

# Command Line Argument

## Example

```
for(i = 1; i < argc; i++) {  
    for(j = 0; j < NPLANETS; j++)  
        if(strcmp(argv[i], planets[j]) == 0) {  
            printf("%s is planet No. %d\n", argv[i], j + 1);  
            break;  
        }  
    if (j == NPLANETS)  
        printf("%s is not a planet\n", argv[i]);  
}
```

# Handling Text Files in C

## Streams

- **Stream**: any source of input or any destination for output.
- So far only one stream was used for each, namely, **keyboard** for all input, and **screen** for output.
- Programs may need additional streams often represented by files stored in HDD, CD/DVD, etc.
- Also represented by network ports, printer etc which don't store files.
- Let us talk about files (which alternate for streams) only.
- Functions in **stdio.h** work equally well for any stream not just files.

# Handling Text Files in C

## File Pointers

- Accessing a stream is done through a file pointer.
- Its type is `FILE *` which is declared in `stdio.h`
- Certain streams are represented by file pointers with standard names.
- For other file pointers should be declared: `FILE *fp1, *fp2;`
- Standard file pointers are `stdin`, `stdout`, `stderr`
- We neither have to open nor have to close these pointers.

# Handling Text Files in C

## Parameter List in Main

- Standard streams can be redirected to get these represented by files associated with other devices.
- Input redirection forces the input to be read from a file.
- Similarly output redirection forces the output to be sent to file.

### Example

For example,

program `<in.dat >out.dat`

takes input from `in.dat` and throws output to `out.dat`

# Handling Text Files in C

## Text Files

- `<stdio.h>` supports both binary and text files.
- Text files have following characteristics:
  - Divided into lines, each terminated by a linefeed character.
  - May contain a special EOF (CTRL-Z), but this not required in Linux.
- Binary files do not have EOL or EOF, all bytes are treated equally.
- Bytes will be reversed in m/c that store data in little endian order.
- When program reads/write data from/to a file, we need to take into account whether it is a binary/text file.



# Handling Text Files in C

## Need for Binary File

- A program that displays content of a file onto screen will use a text file.
- But a file copying program can not assume file to be copied as a text file, because on encountering EOF rest of the file will be ignored.
- EOF may be just a valid item in the file being copied.
- So it is safer to assume file to be a binary file.

# Handling Text Files in C

## File Operations

- Opening a file: `fopen("File Name", "mode");`
  - `fopen`: returns a file pointer which must be saved for further operations (read/write).
  - `File Name`: could be complete with full/relative path.
  - `Mode`: read ("`r`") or write ("`w`") or read/write ("`rw`").
- Closing a file: `fclose(fileptr);` where `fileptr` is obtained from an `fopen` or `freopen`.

# Handling Text Files in C

## Modes

String	Description
"r"	Reading
"w"	Writing, file need not exist
"a"	Append, file need not exist
"r+"	Reading and writing from beginning
"w+"	Reading and writing (truncate if file exist)
"a+"	Reading and writing (append if file exist)

# Handling Text Files in C

## Modes for Binary Files

String	Description
"rb"	Reading
"wb"	Writing, file need not exist
"ab"	Append, file need not exist
"r+b" / "rb+"	Reading and writing from beginning
"w+b" / "wb+"	Reading and writing (truncate if file exist)
"a+b" / "ab+"	Reading and writing (append if file exist)

# Handling Text Files in C

## Example

```
#include <stdio.h>
#include <stdlib.h>
#define FILE_NAME "example.dat"
int main() {
    FILE *fptr; // Declare a file pointer
    fptr = fopen(FILE_NAME, "r"); // Save the file pointer
    if (fptr == NULL) {
        printf("Can not open %s\n", FILE_NAME);
        exit(EXIT_FAILURE);
    }
    ...
    fclose(fptr); // Close the file
}
```

# Handling Text Files in C

## Attaching a File to an Open Stream

- `freopen` attaches a different file to a stream that is already open.
- Most common use is to attach standard streams: `stdin`, `stdout`, `stderr`.
- Eg: `freopen("myfile", "w", stdout);` causes `stdout` to be represented by `myfile`.
- It closes any file previously associated with `stdout` then reopens the same by associating it with `myfile`.

# Handling Text Files in C

## Example

```
include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[]) {
    FILE *fp;

    if (argc != 2) {
        printf(" Usage: _can_open_filename\n" );
        exit(EXIT_FAILURE);
    }
    if ((fp = fopen(argv[1], "r")) == NULL) {
        printf("%s _can't _be _opened\n", argv[1]);
        exit(EXIT_FAILURE);
    }
    printf("%s _can _be _opened\n", argv[1]);
    fclose(fp);
}
```

# Advanced File Operations

## Example

```
#include <stdio.h>
#include <stdlib.h>
int main(int argc, char *argv[]) {
    FILE *fpsrc, *fpdest;
    char ch;

    /** Code for errors in arguments/opening **/

    while ((ch = getc(fpsrc)) != EOF)
        putc(ch, fpdest);
    fclose(fpdest);
    fclose(fpsrc);
}
```



# Advanced File Operations

## Example

```
if (argc != 3) {  
    fprintf(stderr, "Usage: %s copy src dest\n", argv[0]);  
    exit(EXIT_FAILURE);  
}  
if ((fpsrc = fopen(argv[1], "rb")) == NULL) {  
    printf("%s can't be opened\n", argv[1]);  
    exit(EXIT_FAILURE);  
}  
if ((fpdest = fopen(argv[2], "wb")) == NULL) {  
    printf("%s can't be opened\n", argv[2]);  
    exit(EXIT_FAILURE);  
}
```