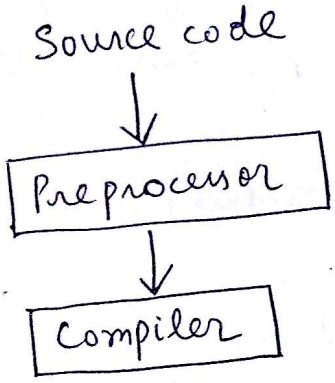
PREPROCESSOR DIRECTIVES

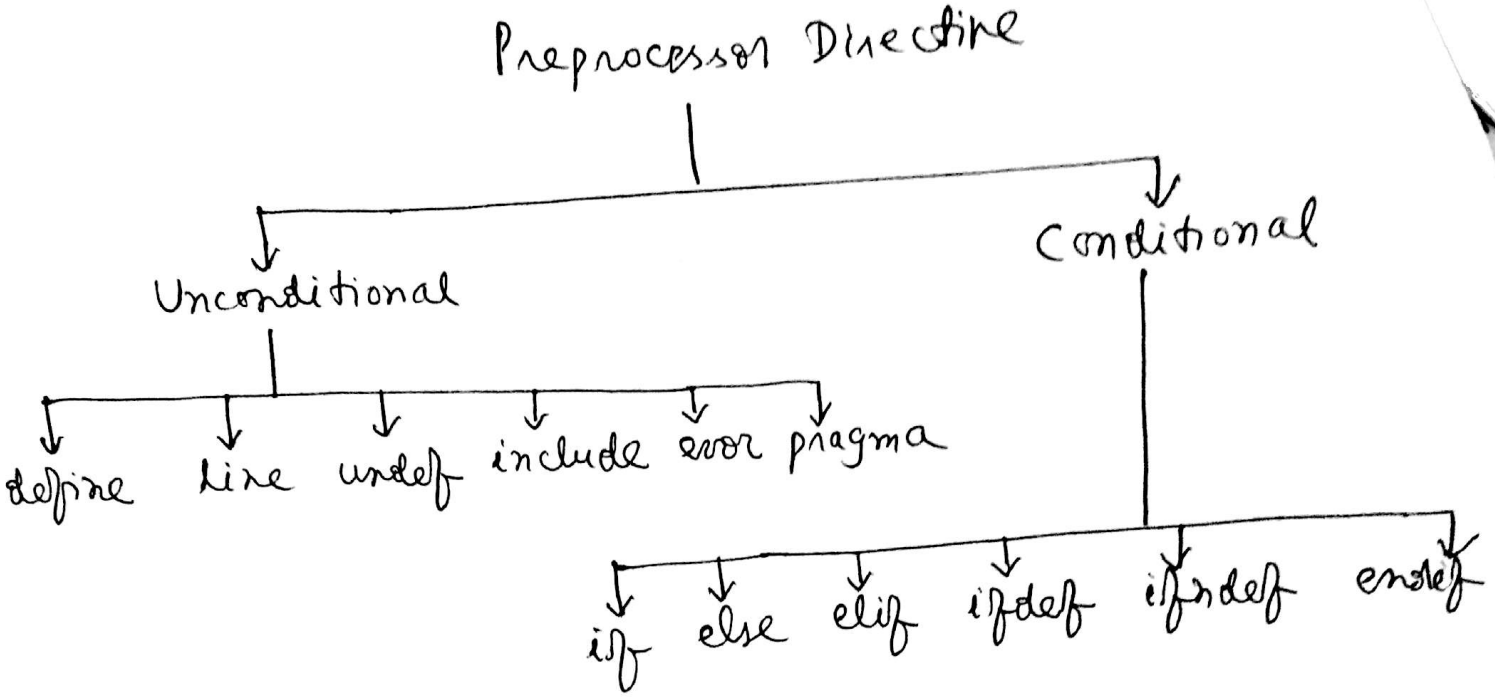
* The preprocessor is a program that processes the source code before it passes through the compiler
* If the preprocessor finds some preprocessor directives, appropriate actions are taken and then the source program is handed over to the compiler



Features of Preprocessor Directives

1) Each preprocessor directive starts with a # symbol
2) There can be only one directive on a line
3) There is no semicolon at the end of a directive
4) They can be placed anywhere in a program but they are normally written at the beginning of a program
5) A preprocessor directive is active from the point of its appearance till the end of the program.

Types of Preprocessor Directives



Unconditional Directives

* These directives perform well-defined tasks

#define

- This is used for defining symbolic constants.
- General syntax:

  #define name constant value

Eg:
```
#define TRUE 1
#define FALSE 0
#define PI 3.14159265
#define MAX 100
```

#line

This directive is used for assigning debugging purposes. It assigns dec-const and string-const to the predefined macros -LINE- and -FILE- respectively.

Syntax:

```
#line dec-const string-const
```

Here dec-const : decimal constant

string-const : string constant

-LINE- : decimal constant that represents the line no. being compiled

-FILE- : string constant that represents the name of the file being compiled.

macro : name given to a block of C statements as a pre-processor directive. A macro is defined with the preprocessor directive.

#error

- This preprocessor directive is used for debugging purpose.
- #error directive stops compilation and displays an error message attached with it.

Pragma Directives

* #pragma directive is used to control the actions of the compiler in a particular portion of a program without affecting the program as a whole
* The effect of pragma is applied from the point where it is included till the end
* #pragma is an instruction to the compiler and is normally ignored during preprocessing

Syntax :

```
#pragma string
```

Types of pragma Directives

P-342 (Reema Thareja book)

#undef

- The definition of a directive exist from the #define directive till the end of the program
- To undefine this directive, the #undef directive is used

Syntax:

```
#undef directive-name
```

#include

- #include is used to include a file into the source code
- This directive is used to include header files in our programs

Syntax:

```
#include <filename>
```

Conditional Directives

* There may be situations when we want to compile some parts of the code based on some conditions.
* Compilation of a part of code based on some condition
* The conditions are checked during the preprocessing phase.
* The conditional directives are:

#if and #endif

An expression which is followed by the #if is evaluated, if the result is non-zero then the statements between #if and #endif are compiled; otherwise they are skipped.

```
#if condition
  ---
  ---
#endif
```

#else and #elif

- It is analogous to if...else control statement.
- #else is used with the #if preprocessor directive

```
#if condition1
    statements1
#elif condition2
    statements2
#else
    statements3
#endif
```

- If the condition evaluates to non-zero, then the corresponding statements between #if and #else are compiled
- Otherwise the statements between #else and #endif are compiled.

#ifdef and #ifndef

These directives provide a way of combining #if with #define directive.

Syntax of #ifdef

```
#ifdef symbolic-name
   ===
#endif
```

If the symbolic name has been defined with #define, then the statements between #ifdef and #endif will be compiled. Otherwise, the statements in between are not compiled.

Syntax of #ifndef

```
#ifndef symbolicname
   ===
#endif
```

If the symbolic_name has not been defined with #define or was undefined using #undef, then the statements between #ifndef and #endif are compiled. Otherwise, not compiled.

Command Line Arguments

* C language provides a method to pass parameters to the main() function. This is accomplished by specifying arguments on the main() function.
* The main() function can accept two arguments:

Full declaration of main():

```
int main ( int argc , char * argv[] )
```

where - the first argument (argc) specifies the number of command line arguments
- the complete list of all the command line argument (*argv[] is an array of character pointers)
- Each element of the array argv is a pointer pointing to a string
- Normally, argv[0] is the name of the program or empty string if name is not available
- argv[1] points to the next parameter, and so on.

Example

```
#include <stdio.h>
int main (int argc, char *argv[])
{
    int i;
    printf ("No. of arguments passed = %d", argc);

    for (i = 0; i < argc; i++)
        printf ("arg[i]= %s \n", argv[i]);
    return 0;
}
```

DOS shell: Command Prompt (Execute the program from DOS in command prompt by writing)

o/p: C:\>tc test.c Reema Thareja

argc = 3 argv[0] = test.c
argv[1] = Reema
argv[2] = Thareja

```
/* C program to add two nos. using command
                line arguments */

#include <stdio.h>
void main (int argc, char * argv[])
{
    int i, sum = 0;
    if (argc != 3)
    {
        printf ("You have forgot to type nos.");
        exit(1);
    }
```

```
printf("Sum is: ");
for (i=1; i<argc; i++)
    sum = sum + atoi(argv[i]);
printf("%d", sum);
}
```

Steps to be followed to execute program using Command Line Arguments in C

step 1: Write a Program

step 2: Open command prompt inside C

step 3: Click on file → DOS Shell

step 4: Inside command Prompt type this command :

```
C:TCBIN> add.c 10 20
The sum is : 30
C:TCBIN>
```

step 5: Hit enter, you will get the o/p:

step 6: Type exit command to return to Turbo C Screen.