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**(AUTONOMOUS)
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DEPARTMENT OF COMPUTER SCIENCE

Programming in C

UNIT 4 – INTRODUCTION TO POINTERS

TOPIC: C PREPROCESSOR



Outline



- ✓ C Preprocessor
- ✓ C Macros
- ✓ Types of Macros
- ✓ File inclusion
- ✓ Conditional Compilation



C Preprocessor



The C preprocessor is a micro processor that is used by compiler to transform your code before compilation. It is called **micro preprocessor** because it allows us to add **macros**.

All preprocessor directives starts with **hash # symbol**.

#include

#define

#if

#else

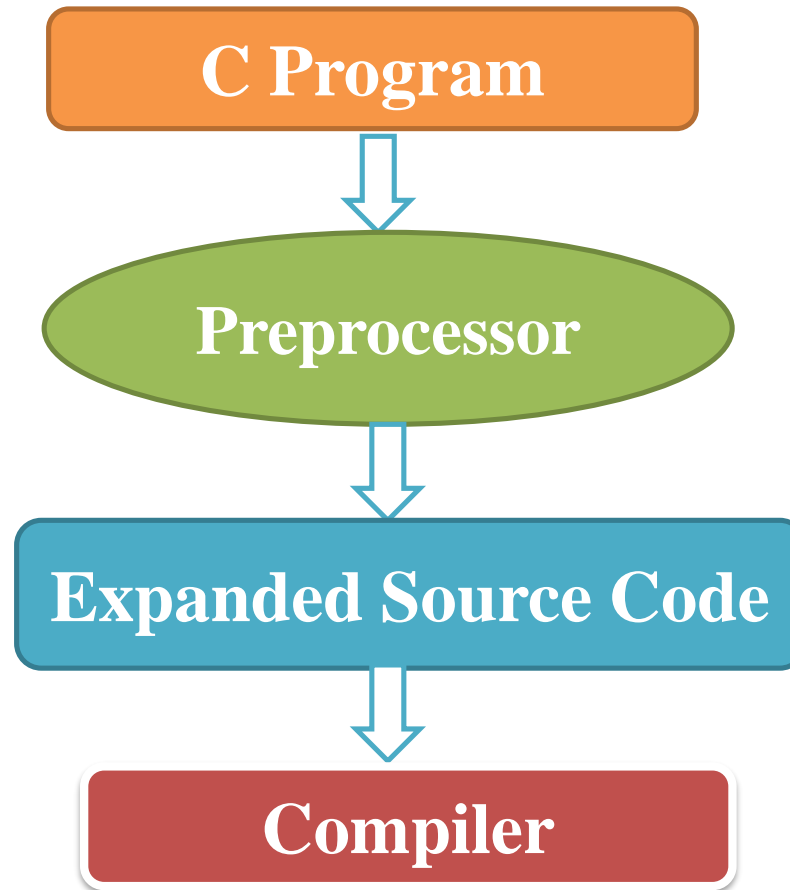
#elif

#endif

#error



C Preprocessor





C Macros

- ✓ A macro is a segment of code which is replaced by the value of macro.
- ✓ Macro is defined by #define directive.

Types of Macros

Object-like Macros

Function-like Macros



Contd



Object-like Macros

The object-like macro is an identifier that is replaced by value. It is widely used to represent numeric constants.

For example:

```
#define PI 3.14
```

Here, PI is the macro name which will be replaced by the value 3.14.

Function-like Macros

The function-like macro looks like function call.

For example:

```
#define MIN(a,b) ((a)<(b)?(a):(b))
```

Here, MIN is the macro name.



C Preprocessor Macros



ANSI C defines many predefined macros that can be used in c program.

No.	Macro	Description
1	<code>_DATE_</code>	represents current date in "MMM DD YYYY" format.
2	<code>_TIME_</code>	represents current time in "HH:MM:SS" format.
3	<code>_FILE_</code>	represents current file name.
4	<code>_LINE_</code>	represents current line number.

EXAMPLE



Contd. Example



```
#include<stdio.h>
void main()
{
    printf("File :%s\n", __FILE__ );
    printf("Date :%s\n", __DATE__ );
    printf("Time :%s\n", __TIME__ );
    printf("Line :%d\n", __LINE__);
    getch();
}
```

OUTPUT

```
File :simple.c
Date :Dec 6 2015
Time :12:28:46
Line :6
```




File inclusion



Include directives are typically used to include the C header files for C functions that are held outside of the current source file.

```
#include <header_file>
```

Or

```
#include "header_file"
```

Example:

```
#include<stdio.h> →input-output functions
```

```
#include<stdlib.h> →utility functions
```

```
#include<string.h> →String functions
```

```
#include<math.h> →Mathematical functions
```



Conditional Compilation



Conditional compilation is **the process of selecting which code to compile and which code to not compile similar to the #if / #else / #endif in C**

✓ **#if**

✓ **#elif**

#if :The #if preprocessor directive evaluates the expression or condition. If condition is true, it executes the code otherwise #elseif or #else or #endif code is executed.

Syntax

```
#if expression  
//code  
#endif
```

Syntax with #else:

```
#if expression  
//if code  
#else  
//else code  
#endif
```



Contd



Syntax with #elif:

```
#if expression
//if code
#elif expression
//elif code
#else
//else code
#endif
```



Example



```
#include <stdio.h>
#include <conio.h>
#define NUM 1
void main() {
    #if NUM==0
    printf("Value of Number is: %d",NUM);
    #else
    print("Value of Number is non-zero");
    #endif
    getch();
}
```

OUTPUT:

Value of Number is non-zero



Example



```
#include <stdio.h>
#include <conio.h>
#define NUM 1
void main() {
#if NUM==0
printf("Value of Number is: %d",NUM);
#else
print("Value of Number is non-zero");
#endif
getch();
}
```

OUTPUT:

Value of Number is non-zero



Example for #elif



```
#include<stdio.h>
#define MARKS 50
void main()
{
    #if(MARKS >= 80 && MARKS <= 100)
        printf("GRADE A\n");
    #elif(MARKS >= 60 && MARKS <=79)
        printf("GRADE B\n");
    #elif(MARKS >= 40 && MARKS <= 59)
        printf("GRADE C\n");
    #elif(MARKS >= 30 && MARKS <= 39)
        printf("GRADE D\n");
    #else
        printf("Please retake the test!\n");
    #endif // MARKS
    printf("Your Result\n");
    getch();
}
```

OUTPUT:
GRADE C
Your Result

QUERIES ???

(if any..)



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