CS101: Problem Solving through C Programming

Sachchida Nand Chaurasia
Assistant Professor

Department of Computer Science
Banaras Hindu University
Varanasi
Email id: snchaurasia@bhu.ac.in, sachchidanand.mca07@gmail.com

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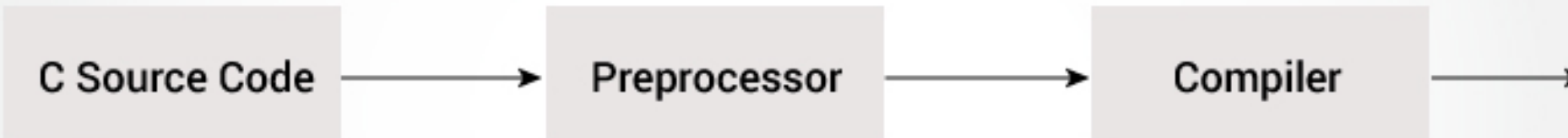
C Preprocessor and Macros I



Including Header Files: #include:

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

Macros using #define:

```c
#define c 299792458  // speed of light
```

Example 1: #define preprocessor:

```c
#include <stdio.h>
#define PI 3.1415

int main()
{
     float radius, area;
     printf("Enter the radius: ");
     scanf("%f", &radius);

     // Notice, the use of PI
     area = PI*radius*radius;

     printf("Area=%.2f",area);
```

```
14      return 0;
15  }
```

Function like Macros:

```
1  #define circleArea(r) (3.1415*(r)*(r))
```

Example 2: Using #define preprocessor:

```
1  #include <stdio.h>
2  #define PI 3.1415
3  #define circleArea(r) (PI*r*r)
4
5  int main()
6  {
7       float radius, area;
8
9       printf("Enter the radius: ");
10      scanf("%f", &radius);
11      area = circleArea(radius);
12      printf("Area = %.2f", area);
13
14      return 0;
```

```
15 }
```

Conditional Compilation:

#ifdef Directive:

```
1 #ifdef MACRO
2    // conditional codes
3 #endif
```

#if, #elif and #else Directive

```
1 #if expression
2    // conditional codes
3 #endif
```

```
1 #if expression
2    conditional codes if expression is non-zero
3 #else
4    conditional if expression is 0
5 #endif
```

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```
#if expression
// conditional codes if expression is non-zero
#elif expression1
// conditional codes if expression is non-zero
#elif expression2
// conditional codes if expression is non-zero
#else
// conditional if all expressions are 0
#endif
```

#defined

```
#if defined BUFFER_SIZE && BUFFER_SIZE >= 2048
  // codes
```

Predefined Macros:

```
Macro Value
__DATE__ A string containing the current date
__FILE__ A string containing the file name
__LINE__ An integer representing the current line number
__STDC__ If follows ANSI standard C, then the value is a nonzero integer
__TIME__ A string containing the current date.
```

Example 3: Get current time using __TIME__

```c
#include <stdio.h>
int main()
{
        printf("Current time: %s",__TIME__);
}
```

preprocessor directives:

Directives	Description
#define	It substitutes a preprocessor macro.
#include	It inserts a particular header file from another file.
#undef	A preprocessor macro is undefined.
#ifdef	It returns true if the macro is defined.
#ifndef	It returns true if the macro is not defined.
#if	It tests if the compile time condition is true.
#else	It is an alternative for #if.
#elif	It has #else and #if in one statement.
#endif	The conditional preprocessor is ended.
#error	It prints the error message on stderr.
#pragma	It issues special commands to the compiler by using a standardized method.