Lecture – 18

Preprocessor directory: The source code for C program can include various instructions to the compiler. A preprocessor directive performs macro substitution conditional compilation and inclusion of named files.

The C preprocessor as defined by the ANSI C standard contains the following directives :
#if, #elif, #else, #ifdef, #ifndef, #endif, #include, #define, #undef, #line, #error, #pragma.

All the preprocessors begin with a #.

#define: The #define directive is used to define an identifier and a character sequence that is encountered in the source file. The identifier is called a macro name, and the replacement process is called macro substitution. The general form of the directive is:

        #define macroname replacement_text

Example 1:
        #define MAX 100
        #define one 1
        #define two one+one
        #define three two+one
        #define str "hellow"

The #define has another powerful feature. The macro name can have arguments.

Example 2:
        #define MIN(a,b) ((a)<(b))?a : b

        void main(void)
        {
                int x = 10, y = 20 ; printf("Minimum %d\n", MIN(x,y));
        }

```
Minimum 10
```

In compile time, printf("Maximum %d\n", MIN(x,y)); will be replaced by printf("Minimum %d\n", ((x)<(y))?x : y);

Example 3:

```
#define EVEN(a) a%2 = = 0 ? 1 : 0

void main(void)
{
        if(EVEN(9+1))
                printf("This is even\n");
        else
                printf("This is odd\n");
}
```

```
This is odd
```

Other Examples:[defining if….else & loop in marco]

```
#define SUM_A(x, y)             \
({                              \
   double answer;               \
   if ((x) == 0 || (y) == 0)    \
      answer = 0;               \
   else                         \
      answer = x+y;             \
   (answer);                    \
})
```
……

```
#define LOOP(start, end)           \
 for (int i = (start); i < (end); i++) {    \
   printf("%d\n", i);                      \
  }
```

……

```
#define loopSum(start, end)    \
({  int sum=0;                  \
   for(int i=start; i<=end;i++)    \
      sum+=i;                   \
   (sum);                       \
})
```

……

Conditional compilation: Syntax of conditional compilation is given below:

```
#if expression
        statement
#endif
```

Example 4:

```
#define MAX 12
#define SERIAL 5
void main(void)
{
        int flag = 0 ;
        #if MAX>10
                flag = 1;
                #if SERIAL
                        int port = 198;
                #else
                        int port = 200;
                #endif
        #else
                char a[100]="hellow";
        #endif

        if(flag)
                printf("%d",port);
        else
                printf("%s",a);
}
```

```
198
```

Example 5:

```
#define TED

void main(void)
{
        #ifdef TED
                printf("TED is defined\n");
        #else
                printf("TED is not defined\n");
        #endif
}
```

```
TED is defined
```