Macros vs Functions

Macros are **pre-processed** which means that all the macros would be processed before your program compiles. However, functions are **not preprocessed but compiled**.

See the following example of Macro:

```
#include<stdio.h>
#define NUMBER 10
int main()
{
     printf("%d", NUMBER);
     return 0;
}
```

Run on IDE

Output:

```
10
```

See the following example of Function:

```
#include<stdio.h>
int number()
{
    return 10;
}
int main()
{
    printf("%d", number());
    return 0;
}
```

Run on IDE

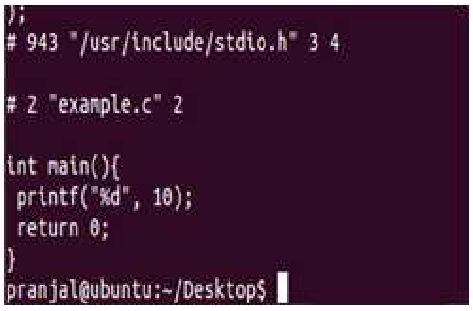
Output:

```
10
```

Now compile them using the command:

```
gcc -E file_name.c
```

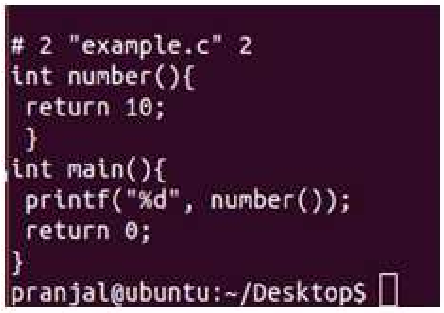
This will give you the executable code as shown in the figure:



```
};
# 943 "/usr/include/stdio.h" 3 4

# 2 "example.c" 2

int main(){
 printf("%d", 10);
 return 0;
}
pranjal@ubuntu:~/Desktop$
```



```
# 2 "example.c" 2
int number(){
 return 10;
 }
int main(){
 printf("%d", number());
 return 0;
}
pranjal@ubuntu:~/Desktop$
```

This shows that the macros are preprocessed while functions are not.

In macros, no type checking(incompatible operand, etc.) is done and thus use of micros can lead to errors/side-effects in some cases. However, this is not the case with functions. Also, macros do not check for compilation error (if any). Consider the following two codes:

Macros:

```
#include<stdio.h>
#define CUBE(b) b*b*b
int main()
{
     printf("%d", CUBE(1+2));
     return 0;
}
```

Run on IDE

Output: Unexpected output

```
7
```

Functions:

```
#include<stdio.h>
int cube(int a)
{
     return a*a*a;
}
int main()
{
    printf("%d", cube(1+2));
    return 0;
}
```

Run on IDE

Output: As expected

```
27
```

- Macros are usually one liner. However, they can consist of more than one line, Click here to see the usage. There are no such constraints in functions.
- The speed at which macros and functions differs. Macros are typically faster than functions as they don't involve actual function call overhead.

Conclusion:
Macros are no longer recommended as they cause following issues. There is a better way in modern compilers that is inline functions and const variable. Below are disadvantages of macros:

a) There is no type checking

b) Difficult to debug as they cause simple replacement.

c) Macro don't have namespace, so a macro in one section of code can affect other section.

d) Macros can cause side effects as shown in above CUBE() example.

See following for more details on macros:
Interesting facts about Macros and Preprocessors

This article is contributed by **Pranjal Mathur.** If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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