

Assembly - Constants

There are several directives provided by NASM that define constants. We have already used the EQU directive in previous chapters. We will particularly discuss three directives –

- EQU
- %assign
- %define

The EQU Directive

The **EQU** directive is used for defining constants. The syntax of the EQU directive is as follows –

```
CONSTANT_NAME EQU expression
```

For example,

```
TOTAL_STUDENTS equ 50
```

You can then use this constant value in your code, like –

```
mov  ecx,  TOTAL_STUDENTS
cmp  eax,  TOTAL_STUDENTS
```

The operand of an EQU statement can be an expression –

```
LENGTH equ 20
WIDTH  equ 10
AREA   equ length * width
```

Above code segment would define AREA as 200.

Example

The following example illustrates the use of the EQU directive –

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```

SYS_EXIT    equ 1
SYS_WRITE   equ 4
STDIN       equ 0
STDOUT      equ 1
section .text
    global _start      ;must be declared for using gcc

_start:      ;tell linker entry point
    mov eax, SYS_WRITE
    mov ebx, STDOUT
    mov ecx, msg1
    mov edx, len1
    int 0x80

    mov eax, SYS_WRITE
    mov ebx, STDOUT
    mov ecx, msg2
    mov edx, len2
    int 0x80

    mov eax, SYS_WRITE
    mov ebx, STDOUT
    mov ecx, msg3
    mov edx, len3
    int 0x80

    mov eax, SYS_EXIT    ;system call number (sys_exit)
    int 0x80              ;call kernel

section .data
msg1 db 'Hello, programmers!', 0xA, 0xD
len1 equ $ - msg1

msg2 db 'Welcome to the world of,', 0xA, 0xD
len2 equ $ - msg2

msg3 db 'Linux assembly programming! '
len3 equ $ - msg3

```

When the above code is compiled and executed, it produces the following result –

```

Hello, programmers!
Welcome to the world of,

```

Linux assembly programming!

The %assign Directive

The **%assign** directive can be used to define numeric constants like the EQU directive. This directive allows redefinition. For example, you may define the constant TOTAL as –

```
%assign TOTAL 10
```

Later in the code, you can redefine it as –

```
%assign TOTAL 20
```

This directive is case-sensitive.

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The %define Directive

The **%define** directive allows defining both numeric and string constants. This directive is similar to the #define in C. For example, you may define the constant PTR as –

```
%define PTR [EBP+4]
```

The above code replaces PTR by [EBP+4].

This directive also allows redefinition and it is case-sensitive.