

# Basics of x86 assembly

# WHAT IS x86 ARCHITECTURE

- The x86 architecture is an instruction set architecture (ISA) series for computer processors.
- Developed by Intel Corporation, x86 architecture defines how a processor handles and executes different instructions passed from the operating system (OS) and software programs.
- The “x” in x86 denotes ISA version.

# REGISTERS

- A special high speed area in the processor
- General purpose registers
  - 16 bit: ax, bx, cx, dx
  - 32 bit: eax, ebx, ecx, edx
  - 64 bit: rax, rbx, rcx, rdx
- Pointer registers
  - \*SP, \*BP, \*IP
- Index registers
  - \*SI, \*DI
- Flags

# INSTRUCTIONS

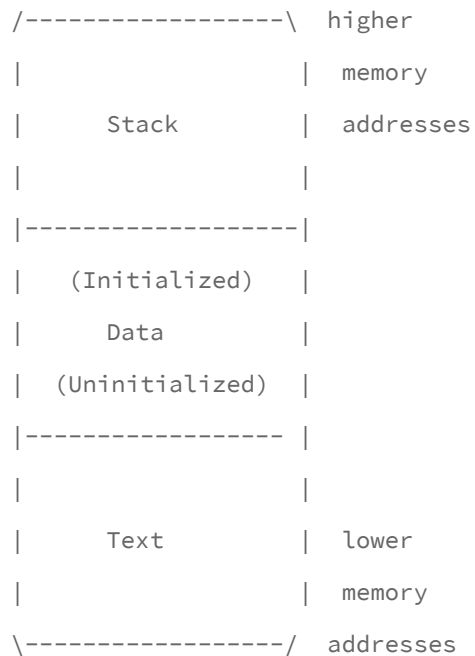
## AT&T Syntax(src, dest)

- push/pop %rbp
- mov \$0xa, %edi
- add/sub \$0ax, %rax
- call 0x680
- jle/jne/jmp/je 0x7fa
- lea 0xe4(%rip), %rdi
- ret

## Intel (dest, src)

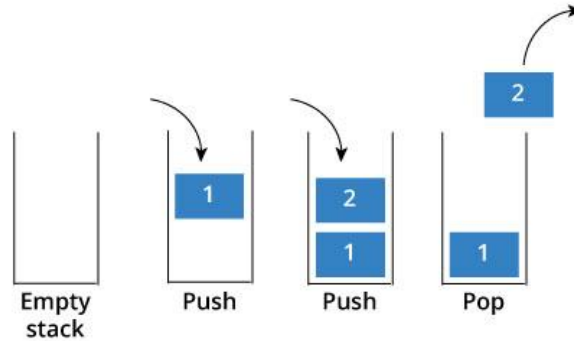
- push/pop rbp
- mov edi, 0xa
- add/sub rax, 0xa
- call 0x680
- jle/jne/jmp/je 0x7fa
- lea rdi, [rip +0xe3]
- ret

# PROCESS MEMORY REGION



# STACK

- An area memory that's used during program execution
- Follows the "Stack" data structure.
- Last in first out (LIFO)



# STACK POINTERS

- Stack pointer (SP)
- Frame pointer / local base pointer (FP/LBS)

# ENDIANNESS

Endianness refers to the order of bytes within a binary representation of a number.

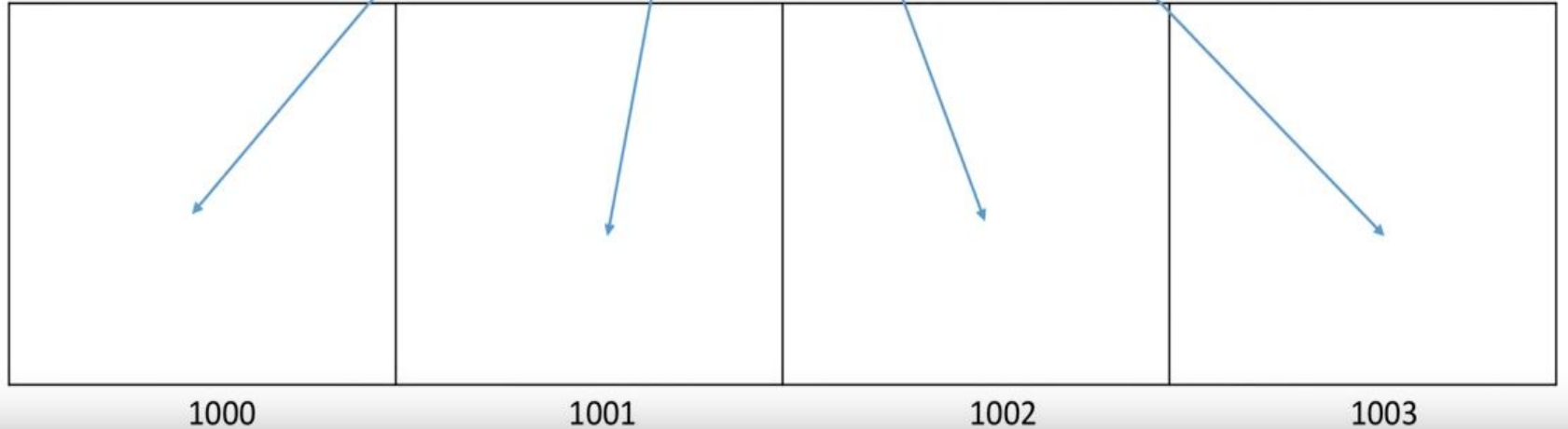
Two types that we will discuss:

- Big endian
- Little endian



# Big Endian

12 34 56 78<sub>16</sub>



# Little Endian

12 34 56 78<sub>16</sub>

