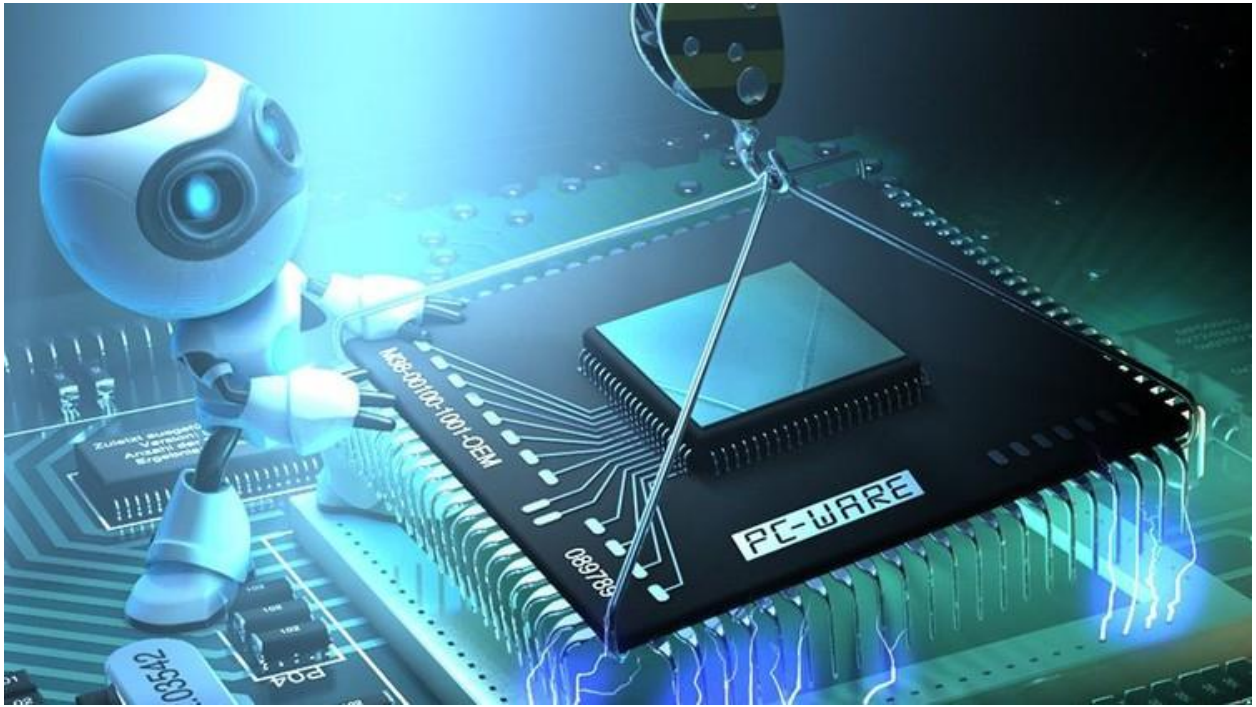
Iterative Statement (WHILE)



Iterative Statement (WHILE)

MODEL:

```
while (cond) {
    BODY-WHILE
}
```

Generic translation:

```
while: evaluate condition
       j(fails) end
       BODY-WHILE
       jmp while
end:
```

Iterative Statement (WHILE)

```
int gcd(int a, int b) {
  while (b!=0) {
    if (a>b) a = a-b;
        else b = b-a;
  }
  return a;
}
```

Example 1 of WHILE

```c
int gcd(int a, int b) {
  while (b!=0) {
    if (a>b) a = a-b;
        else b = b-a;
  }
  return a;
}
```

```
gcd:    pushl %ebp
        movl %esp, %ebp
while:  cmpl $0, 12(%ebp)
        je end
        movl 8(%ebp),%eax
        cmpl 12(%ebp),%eax
        jle else
        subl 12(%ebp),%eax
        jmp endif
else:   subl %eax, 12(%ebp)
endif:  jmp while
end:    popl %ebp
        ret
# a → 8[%ebp]
# b → 12[%ebp]
```

Example 2 of WHILE

Example:

```
int gcd(int a, int b) {
  int tmp;
  while (b!=0) {
    tmp = b;
    b = a%b;
    a = tmp;
  }
  return a;
}
```

```
gcd:    pushl %ebp
        movl %esp, %ebp
        subl $4, %ebp
while:  cmpl $0,12(%ebp)
        je end
        movl 12(%ebp), %ecx
        movl 8(%ebp), %eax
        cltd
        idivl 12(%ebp)
        movl %edx, 12(%ebp)
        movl %ecx, 8(%ebp)
        jmp while
end:    movl 8(%ebp), %eax
        movl %ebp, %esp
        popl %ebp
        ret
# a → 8[%ebp]
# b → 12[%ebp]
```

```
# result in % eax
```

Example 2 of WHILE

Example:

```
int gcd(int a, int b) {
  int tmp;
  while (b!=0) {
    tmp = b;
    b = a%b;
    a = tmp;
  }
  return a;
}
```

```
gcd:    pushl %ebp
        movl %esp, %ebp
        subl $4, %ebp
while:  cmpl $0,12(%ebp)
        je end
        movl 12(%ebp), %ecx
        movl 8(%ebp), %eax
        cltd
        idivl 12(%ebp)
        movl %edx, 12(%ebp)
        movl %ecx, 8(%ebp)
        jmp while
end:    movl 8(%ebp), %eax
        movl %ebp, %esp
        popl %ebp
        ret
# a → 8[%ebp]
# b → 12[%ebp]
```

b = a % b

a = tmp

result in % eax