

CS 271 Computer Architecture and Assembly Language

Self-Check for Lecture #4

Solutions

Solve each problem using the following data segment:

```
.data
k      DWORD ?
n      DWORD ?
x      DWORD ?
y      DWORD ?
z      DWORD ?
yes    BYTE    "Yes", 0
no     BYTE    "No", 0
maybe BYTE    "Maybe" ,0
```

Assume that variables have been initialized.
Write MASM code to implement the following high-level pseudo-code decision structures.

```
1.
if (k < n)
    print (yes);
else
    print (no);

2.
if (k < n)
    print (maybe);
else
    if (k > n)
        print(no);
    else
        print (yes);

3.
if ((x < y) AND (y < z))
    print (yes);
else
    print (no);

4.
if ((x < y) OR (x > z))
    print (no);
else
    print (maybe);
```

NOTE: You cannot `cmp` memory to memory. At least one of the operands must be a register or a constant.

```
1.
    mov     eax, k
    cmp     eax, n
    jl      true
    mov     edx, OFFSET no
    call    WriteString
    jmp     theEnd
true:
    mov     edx, OFFSET yes
    call    WriteString
theEnd:

2.
    mov     eax, k
    cmp     eax, n
    jl      true_1
    jg      true_2
    mov     edx, OFFSET yes
    call    WriteString
    jmp     theEnd
true_1:
    mov     edx, OFFSET maybe
    call    WriteString
    jmp     theEnd
true_2:
    mov     edx, OFFSET no
    call    WriteString
theEnd:

3.
    mov     eax, x
    cmp     eax, y
    jge     false
    mov     ebx, z
    cmp     y, ebx
    jge     false
    mov     edx, OFFSET yes
    call    WriteString
    jmp     theEnd
false:
    mov     edx, OFFSET no
    call    WriteString
theEnd:

4.
    mov     eax, x
    cmp     eax, y
    jl      true
    cmp     eax, z
    jg      true
    mov     edx, OFFSET maybe
    call    WriteString
    jmp     theEnd
true:
    mov     edx, OFFSET no
    call    WriteString
theEnd:
```