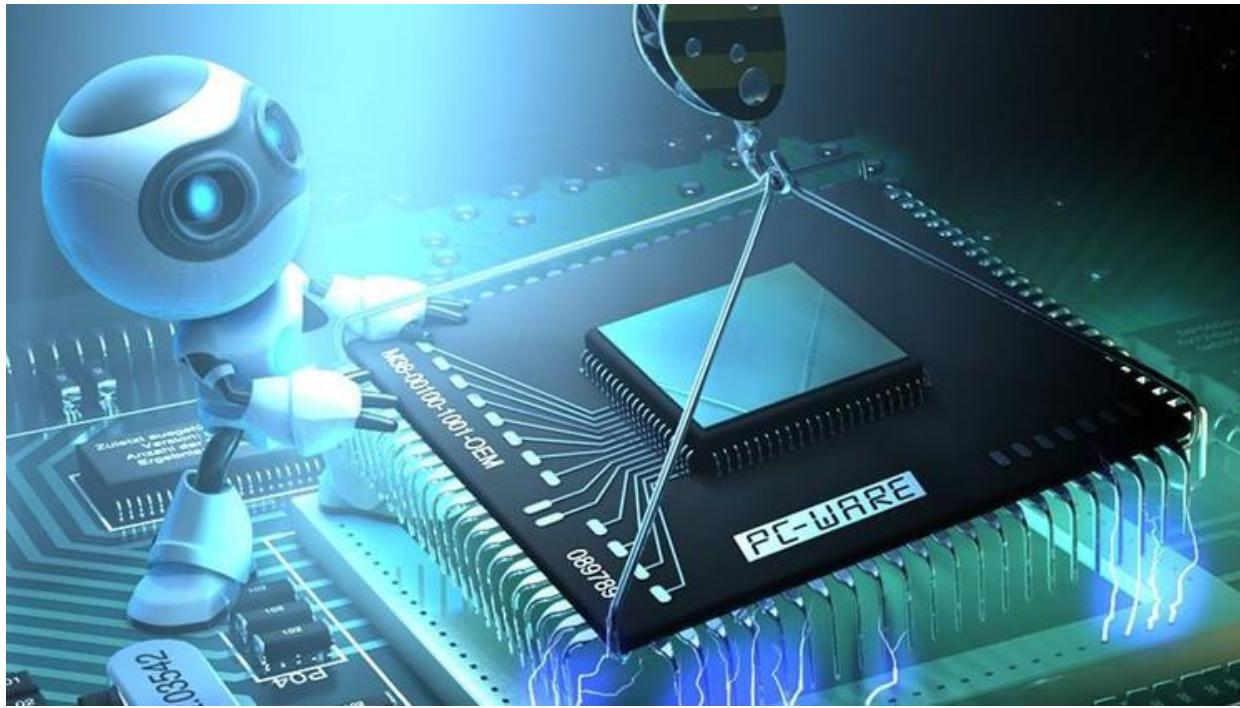
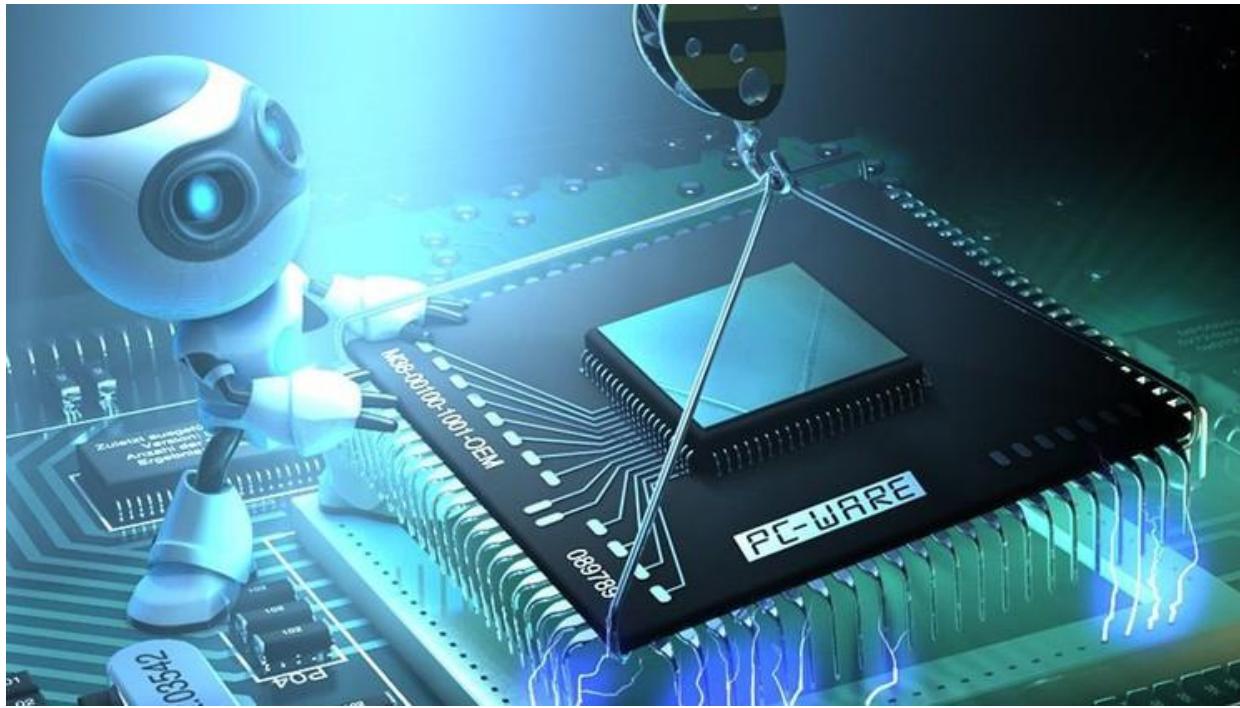


Laboratory Session 2



Practise - Problem 2



Practise - Problem 2



2. Translate the Find routine to x86 assembler.

```
int Find(S1 v[], S1 X, int N)
{
    int low, high, mid;
    int found = -1;

    low = 0;
    mid = low;
    high = N-1;
    while (low <= high) {
        found = FindElement(&low, &high, &mid, X, v);
        if (found >= 0) break;
    }
    return found;
}
```





Problem 2

2.

```
int Find(S1 v[], S1 X, int N)
{
    int low, high, mid;
    int found = -1;

    low = 0;
    mid = low;
    high = N-1;
    while (low <= high) {
        found = FindElement(&low, &high, &mid,
X, v);
        if (found >= 0) break;
        return found;
    }
}
```

Part 1/3

```
.text
.align 4
.globl Find
.type Find,@function
```

Find:

```
    pushl %ebp
    movl %esp, %ebp

    movl $-1, -4(%ebp)
    movl $0, -16(%ebp)
    movl $0, -8(%ebp)
    movl 32(%ebp), %ecx
    decl %ecx
    movl %ecx, -12(%ebp)
```

found = -1
low = 0
mid = low
%ecx = N
%ecx = N-1
high = N-1

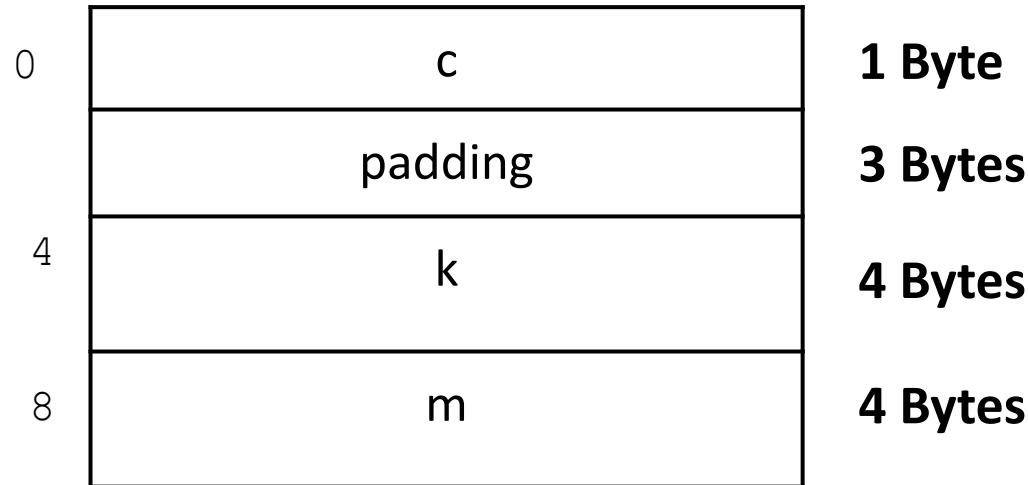


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Previous Study - Problem 1



```
typedef struct {  
    char c;  
    int k;  
    int *m;  
} S1;
```



Total size of struct S1: **12 bytes**



Problem 2

2.

```
int Find(S1 v[], S1 X, int N)
{
    int low, high, mid;
    int found = -1;

    low = 0;
    mid = low;
    high = N-1;
    while (low <= high) {
        found = FindElement(&low, &high, &mid,
X, v);
        if (found >= 0) break;
        return found;
    }
}
```

Part 2/3

while:

```
    movl -12(%ebp), %ecx
    compl %ecx, -16(%ebp)
    jg endwhile
```

high
compare high, low

prepare stack to call FindElement

```
    pushl 8(%ebp)           # &v
    pushl 28(%ebp)          # X.m
    pushl 24(%ebp)          # X.k
    pushb 20(%ebp)          # X.c
    leal -8(%ebp), %ecx
    pushl %ecx
    leal -12(%ebp), %ecx
    pushl %ecx
    leal -16(%ebp), %ecx
    pushl %ecx
```

&mid
&high
&low



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Problem 2

2.

```
int Find(S1 v[], S1 X, int N)
{
    int low, high, mid;
    int found = -1;

    low = 0;
    mid = low;
    high = N-1;
    while (low <= high) {
        found = FindElement(&low, &high, &mid,
X, v);
        if (found >= 0) break;
        return found;
    }
}
```

Part 3/3

call

call FindElement

addl \$28, %ebp

found is already in %eax

compl \$0, %eax
jle endwhile
jmp while

endwhile:

ret
movl %ebp, %esp
popl %ebp

x86

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