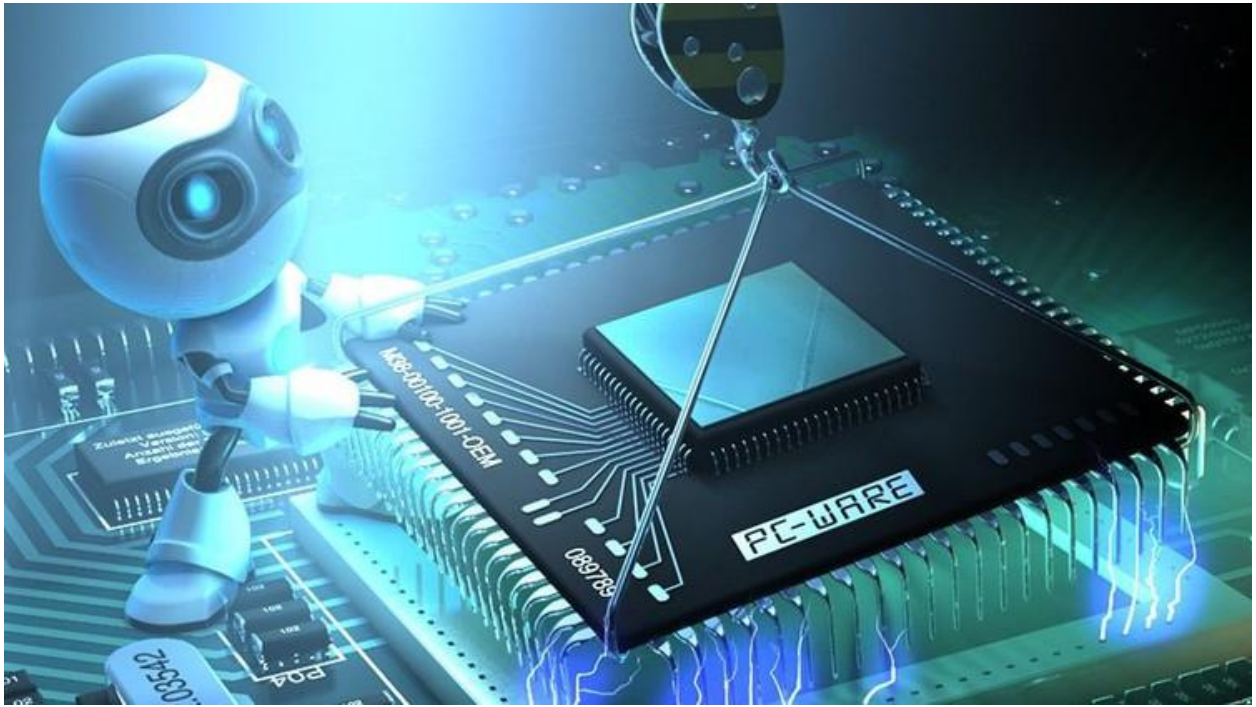
Exam 8 - Problem 1



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Given the following variable declaration:

```
typedef struct{
   char k;
   int b[10];
} nature;
nature s[100];
```

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We know that the address of s is in %ebx and the variables i, j and x are respectively in the %esi, %edi and %dl registers.

a) Draw the struct nature.

b) Determine how the memory address is calculated:

```
s[i].b[j]
```

c) Write the sequence of instructions necessary to encode the following statement:

```
x = s[s[i].b[j]].k
```

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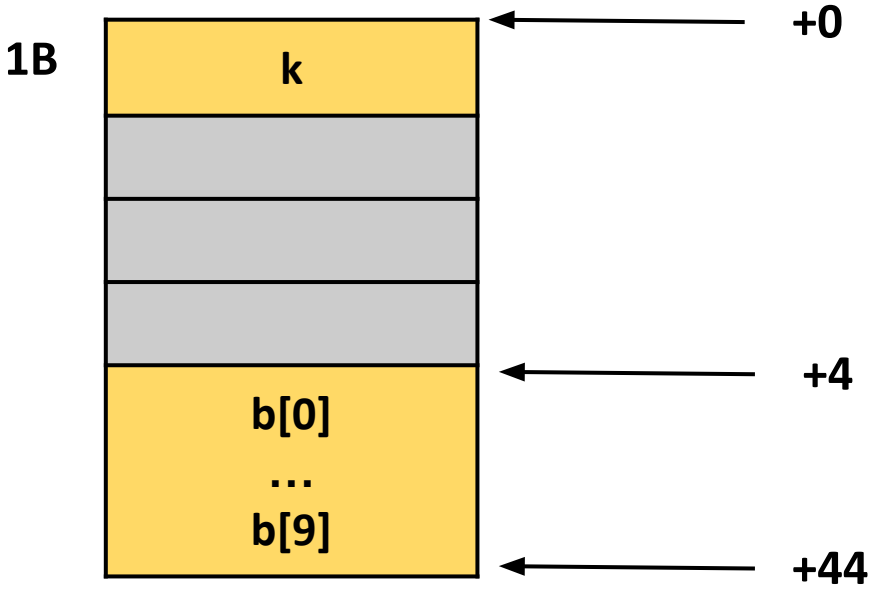
a) Draw the struct nature.



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b) Determine how the memory address is calculated:

```
s[i].b[j]
```

@s[i].b[j] = @s + i * 44 + 4 + j * 4

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c) Write the sequence of instructions necessary to encode the following statement:

```
x = s[s[i].b[j]].k
```

```
imull $44, %esi, %eax                    ; %eax = 44i
addl %ebx, %eax                          ; %eax = @s + 44i
imull $44, 4(%eax, %edi, 4), %eax        ; %eax = (@s +44i +4 + j*4)*44
movb (%ebx, %eax), %dl                   ; %dl = result
```