Question 1:

Mention the different addressing modes of the 8086 processor. Then show how the physical address is calculated in each case.

Question 2:

Let:

\[
\begin{align*}
AX &= 00FFH \quad BX = 0010H \quad CX = 00FEH \quad DX = 1000H \\
SI &= FFBFH \quad DI = 0002H \quad BP = 0200H \quad SP = 0300H \\
DS &= BCFEH \quad ES = 0300H \quad CS = EC4FH \quad SS = 4000H \\
IP &= 24FCH \\
\end{align*}
\]

1 - Suppose the following directives are declared in the data segment. Variables are stored in the order they are given in the data segment starting at offset 4000H. Show the logical and Physical addresses of the allocated memory and the corresponding hexadecimal content.

```assembly
.DATA
X DB 125, -18
DW 0AAFEH
T EQU 'KFUPM'
Text DB 'COE 205','$'
```

<table>
<thead>
<tr>
<th>Variable</th>
<th>Effective Address</th>
<th>Content</th>
<th>Variable</th>
<th>Effective Address</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>4000H</td>
<td>125, -18</td>
<td>DW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>4004H</td>
<td></td>
<td>T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text</td>
<td>4008H</td>
<td></td>
<td>Z</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 - Determine the physical starting and ending addresses of the code segment, the data segment and stack segments.

3 - Determine the address of the next instruction to be fetched from memory.

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4 - Write the result of each of the following operations and show their effects on the flags.

```
MOV AX, Word Ptr X + 2  
ADD AX, BX

MOV AL, Byte Ptr X + 1  
ADD AL, BL

MOV AX, Word Ptr X + 2  
SUB AX, BX  
INC BX  
INC AX  
DEC BX
```

**Question 3:**

Write a program that reads two decimal numbers from the keyboard. Each number should have 2 digits. The program adds the two numbers and displays the result on the screen. Consider each number to be stored in a word sized location.