1. (25 points) Write a program that reads a text form the keyboard up to a new line. The program will then count the the number of punctuation marks ("." , ",", ";", ":", "!", "?" ) found in the text.

Sample run:

It was a dark and stormy night, the wind was blowing and the children were scared... Bang ! What was that ? The loud noise was soon explained: a tree had fallen over.

Number of "." : 4  
Number of "," : 1  
Number of ";" : 0  
Number of ":" : 1  
Number of ":!" : 1  
Number of ":?" : 1

Notes and hints:

• The input is terminated by a new line, so you have to read 1 character at a time up to '\n'.
• The marks you are looking for are 6 distinct and finite choices.
Name ______________________________________
______________________________________________

1. (continued)
2. (25 points) We want to write a **mortgage calculator**. It will simply display month by month what is the outstanding balance on the mortgage at the end of each month for the first year. The inputs are:

1. The amount of the mortgage
2. The annual percentage rate (ex: 7.75)
3. The monthly payment

Sample run:

Mortgage amount $ 75000
APR % 7.75
Monthly payment $ 555.55

1: $ 74928.82
2: $ 74857.18
3: $ 74785.08
4: $ 74712.51
5: $ 74639.47
6: $ 74565.96
7: $ 74491.98
8: $ 74417.52
9: $ 74342.58
10: $ 74267.16
11: $ 74191.24
12: $ 74114.84

Notes and hints:

- The outstanding balance at the end of each month is given by
  \[ balance + (balance \times \text{monthlyrate}) - \text{payment} \]

- Since the rate is given as the **yearly** percentage rate and you need the **monthly fractional rate**, you will have to convert the input rate (ex: APR of 12, means 0.01 per month).

- You are dealing with dollars and cents, so the output will have to be formatted to display **only 2 digits of precision**.
3. (20 points) What does the following code produce?

```c
#include <stdio.h>
int main()
{
    int i1 = 0, i2 = 0, i3 = 0;

    while( i1 < 2 )
    {
        for(i2 = i1; i2 < 5; i2++)
            for(i3 = 9; i3 > i2; i3--)
                printf("%c", '0'+i3);
        printf("\n");
        ++i1;
    }
    printf("All done !!!\n");
    return 0;
}
```
4. (15 points) The following code contains \textbf{at least 5} syntax errors. Identify the line number and the error.

\begin{verbatim}
1. #include <stdio.h>
2. int main();
3. { 
4.     int row; col;
5.     char c;
6.     for(row = 0; row < limit; row++)
7.         for(col = 0, col < limit; col++)
8.             scanf("%c", c);
9.     return 0;
10. }
\end{verbatim}

<table>
<thead>
<tr>
<th>Number</th>
<th>Line</th>
<th>Error</th>
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<tbody>
<tr>
<td>1</td>
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5. (15 points)

i. What is the value of the following expression?

\[(12 - 3) \div (17 \mod 6) * (8 / 2)\]

ii. How many times does the following loop execute?

```c
for(i = 0; i < 10; i += 3)
```

iii. How many times does the following loop execute?

```c
int count = 1, limit = 1;
while( count == limit ) count++;
```

iv. What is the final value of `index` at the end of the following loop?

```c
for(index = 10; index > 2; index -= 3);
```

v. What is the final value of `total` at the end of the following code fragment?

```c
total = 0;
for(i = 0; index < 4; i++)
    for(j = 0; j < 3; j++)
        for(k = 0; k < 2; k++)
            total += 2;
```