Homework 8 Solution - Recursion

1. What does function a output?

```
void a ( )
{
        int x = 0;
        char str[10] = “abc”;
        x = b (str);
        printf (“%d\n”, x);
}

int b (char *p)
{
        if (*p == ‘\0’)
                return (0);
        return (b (p + 1) + 1);
}
```

Answer: 3

2. Write a recursive function to traverse a string copying every other character to a second string.

```
rec (char *str1, char *str2, int flag)
{
        if (*str1 == '\0')
        {
                *str2 = *str1;
                return;
        }

        if (flag == 0)
        {
                *str2 = *str1;
                rec (str1 + 1, str2 + 1, 1)
        }
        else
        {
                rec (str1 + 1, str2, 0);
        }
        return;
}
```

3. Write a recursive function to reverse a linked list. Hint: You may need to pass two pointers into the function.

```
call - rev_list (head, NULL);

void rev_list (NODE *p, NODE *q)
{
        if (p == NULL)
                return;

        if (p->next == NULL)
                head = p;
        else
                rev_list (p->next, p);

        p->next = q;
        return;
}
```

4. Write a recursive function to calculate the nth number in a series of numbers which is defined as follows:

   - 1st number = 1
   - 2nd number = 2
   - 3rd number = 3
   - nth number = average of the 3 previous numbers

```
int rec (int n)
{
      if (n <= 3)
            return (n);

      ave = (rec (n - 1) + rec (n - 2) + rec (n - 3)) / 3;
      return (ave);
}
```