Tutorial - Week 7

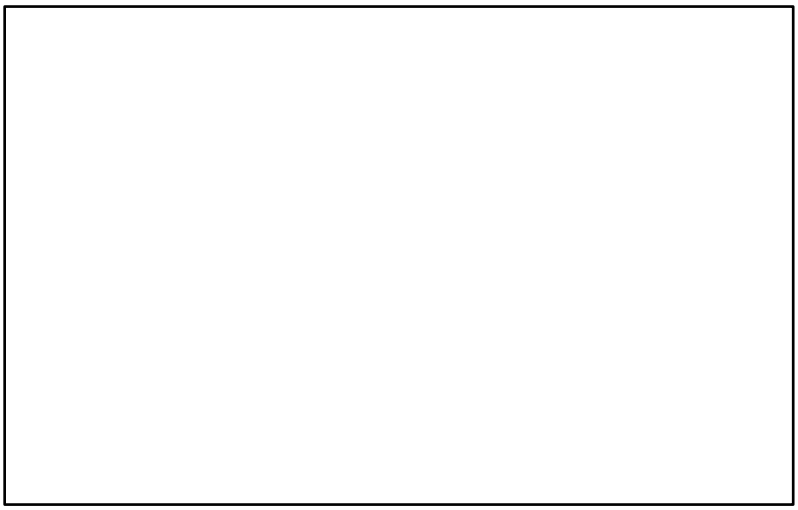
Objectives: To practice with
- Recursive functions
- User Defined Data Types

1. **Consider the following recursive function that calculates x^y:**

   where `x = base;` `y = exponent`

```
int power(int base, int  exponent)
{
      if (exponent == 0)
            return 1;
      else
      return base * power(base, exponent-1);
}
```

   a. **Where is the Base Case?**
   b. **Where is the General Case?**
   c. **What is the returned value of this function call: `result = power( 2, 3);`**
   d. **Draw a diagram explaining all stages that follow this function call.**



2. **Write a recursive function count_digits that counts all the digits in a string.**

3. **What is the output of the following program? What does function `strange` compute when called with a positive integer?**

```
#include <stdio.h>
int strange(int n);
int
```

```
main(void)
{
     printf("%d\n", strange(7));
}
int
strange(int n)
{
     int ans;
     if (n == 1)
          ans = 0;
     else
          ans = 1 + strange(n / 2);
return (ans);
}
```

4. **Write a recursive function `find_sum` that calculates the sum of successive integers starting at 1 and ending at `n` (i.e., `find_sum(n) = (1 + 2 + . . . + ( n – 1) + n`).**