Lab exercise 4

1. **Modify the program, so the value of triangularNumber is returned by the function.**

```
// Function to calculate the nth triangular number
#include <stdio.h>
void calculateTriangularNumber (int n)
{
  int i, triangularNumber = 0;
  for ( i = 1; i <= n; ++i )
  triangularNumber += i;
  printf ("Triangular number %i is %i\n", n,triangularNumber);
}
int main (void)
{
  calculateTriangularNumber (10);
  calculateTriangularNumber (20);
  calculateTriangularNumber (50);
  return 0;
}
```

2. **Modify the program so that it calls the new version of the calculateTriangularNumber() function.**

```
#include <stdio.h>
int main (void)
{
  int n, number, triangularNumber, counter;
  for ( counter = 1; counter <= 5; ++counter ) {
      printf ("What triangular number do you want? ");
      scanf ("%i", &number);
      triangularNumber = 0;
      for ( n = 1; n <= number; ++n )
      triangularNumber += n;
      printf ("Triangular number %i is %i\n\n", number,triangularNumber);
      }
  return 0;
}
```

3. **Write a function that raises an integer to a positive integer power. Call the function x_to_the_n() taking two integer arguments x and n. Have the function return a long int, which represents the results of calculating x^n.**

4. **Write a function called arraySum() that takes two arguments: an integer array and the number of elements in the array. Have the function return as its result the sum of the elements in the array.**

5. **A matrix M with i rows, j columns can be transposed into a matrix N having j rows and i columns by simply setting the value of $N_{a,b}$ equal to the value of $M_{b,a}$ for all relevant values of a and b.**

a. Write a function transposeMatrix() that takes as an argument a 4 × 5 matrix and a 5 × 4 matrix. Have the function transpose the 4 × 5 matrix and store the results in the 5 × 4 matrix. Also write a main() routine to test the function.
b. Using variable-length arrays, rewrite the transposeMatrix() function developed in exercise (a) to take the number of rows and columns as arguments, and to transpose the matrix of the specified dimensions.