

```
#include <time.h>
#include <math.h>
#include <iostream>
#include <fstream>
#include <iomanip>
#include <vector>
#include <valarray>

using namespace std;

// Calculates the factorial of n
double factorial(const int& n)
{
    double f = 1;

    int i=0;
    for(i = 1; i <= n; i++)
    {
        f *= i;
    }
    return f;
}

void muons()
{
    // Declares constants
    const int N = 1000000; // Number of data sets
    const int LOOP_ITR = 101;
    const double AN = 0.1; // Number of events per day

    // Inits local variables
    int k=0, m=0, day=0, num=0, numMuons=0, totMuons=0;
    int maxEvents[LOOP_ITR];
    int totEvents[LOOP_ITR];
    memset (maxEvents, 0, sizeof(int) * LOOP_ITR);
    memset (totEvents, 0, sizeof(int) * LOOP_ITR);

    // Creates our 2d histories array
    vector<valarray<int> > histories(N, LOOP_ITR);
```