Assignment 3

Due: Wednesday, November 7nd, 11:59pm
Send a zip file to Ben Crysup (brc13c@my.fsu.edu) that contains a copy of your program. Put the code into a folder that has your name and the assignment number, for example the folder beerli3 contains main.cpp. Then compress the file (using zip) and attach (for example it would be beerli3.zip). Most importantly, use ISC-3313 in the subject line of the email to Ben. Alternatively, you can copy the file to our dropbox directory on pamd.sc.fsu.edu (or your classroom machine) using this [you need to be on one of the Scientific omcputing machines to do this (or then use the appropriate scp command):

```
cp yourfile.zip /research/pbeerli/isc3313dropbox
```

Calculate the mean and variance of 10, 100, and 1000 random numbers. Use the vector class from the STL (standard template library) to create a program that does not use any *for* or *while* statement.

- Use the *myvector.cpp* program as an idea how to do the random numbers, but you will need to create a function for mean() and variance() and how to gather the numbers in the vector to calculate

$$\text{mean} = \frac{1}{n} \sum a_i$$

$$\text{variance} = \frac{1}{n-1} \sum (a_i - \text{mean})^2$$

  You can pass the vector with the random numbers as a reference, similar to this example definition

  ```
  double mean(const std::vector<double> &v);
  ```

  for the variance calculation you will need also to calculate the mean, and then to make sure that you can get the difference between all values a_i and the mean, you will need to put the mean into a vector of the same size as the data: for example:
  ```
  std::vector<double> meanv;
  std::fill (meanv.begin(),meanv.end());.
  ```

- run the program for 10, 100, 1000 random numbers and discuss the results. You will need to send in the code and a short paragraph that discusses the result.

Peter Beerli, October 2016