一、样本的均值与方差

编写程序，接受用户通过键盘输入的一系列实数，计算这些实数的样本均值与样本方差。用户输入 0 时结束。

样本均值与样本方差公式如下：

$$\overline{X}=\frac{1}{n}\sum_{i=1}^{n}X_i$$

$$S^2=\frac{1}{n-1}\sum_{i=1}^{n}\left(X_i-\overline{X}\right)^2$$

示例代码

```
#include <iostream>
using namespace std;

int  main()
{
  int n = 0;
  double x, sum = 0.0, sum2 = 0.0, mean = 0.0, variance = 0.0;
  cout << "This program accepts some real numbers,";
  cout << "and calculates their mean and variance.\n";
  cout << "To stop, input 0.\n";
  while( true )
  {
    cout << "Input a real number: ";
    cin >> x;
    if( x == 0.0 )  // Not an accurate expression!
      break;
    n++,  sum += x,  sum2 += x * x;
  }
  mean = sum / n;
  variance = ( sum2 - n * mean * mean ) / ( n - 1 );
  cout << "mean: " << mean << ", variance: " << variance << endl;
  return 0;
}
```

二、素因子分解

编写函数 Factorize，将某个不小于 2 的整数 n 展开为素因子的乘积。素因子顺序从小到大。具体输出格式如下：

```
11 = 11
12 = 2*2*3
```

测试程序代码如下：

```
#include <iostream>
using namespace std;
void Factorize( int n );
int main()
{
  int n;
  cout << "This program factorize a number.\n";
  cout << "Input an integer not less than 2: ";
  cin >> n;
  Factorize( n );
  return 0;
}
```

示例代码

```
void Factorize( int n )
{
  int i = 2;
  cout << n << " = ";
  while( i < n )
  {
    if( n % i == 0 )
    {
      cout << i <<  " * ";
      n /= i;
    }
    else
      i++;
  }
  cout << i << endl;
}
```