Homework #3 – Stream Processing Algorithm

In this homework you are asked to use the Template Method pattern to implement a stream processing algorithm and several concrete implemenations. *Note, an explanation of the Template Method pattern can be found in Item 23 in the book.*

You are given the following code as a starting point:

```
class StreamProcessorAlgorithm
{
public:
   StreamProcessorAlgorithm(istream &in, ostream &out) /* ... */
   virtual ~StreamProcessorAlgorithm()                 /* ... */
   void process()                                      /* ... */

private:
   virtual bool filterToken(const string &token) const = 0;
   virtual void processToken(string &token) const = 0;

   istream &in_;
   ostream &out_;
};
```

1. **(3 points)** Provide implementations for the three public `StreamProcessor` functions. The process function should do the following:

   ```
   For each whitespace separated string (token) read from the input stream:
         If the token passes through the filter (i.e. filterToken returns true):
               Process the token and output it to the output stream
   ```

2. **(3 points)** Create class `UppercasingSPA` as a concrete subtype of `StreamProcessorAlgorithm`.
   a. This class should allow all tokens to pass through.
   b. This class should upper case all letters in the tokens that pass through.
   c. Provide several unit tests verifying the behavior of this class.

3. **(3 points)** Create class `DigitStrippingSPA` as a concrete subtype of `StreamProcessorAlgorithm`.
   a. This class should only allow tokens containing at least one digit to pass through.
   b. This class should strip out all digits (0-9) from the tokens that pass through.
   c. Provide several unit tests verifying the behavior of this class.

4. **(1 point)** Make sure your source code is well-commented, consistently formatted, uses no magic numbers/values, follows a consistent style, and is ANSI-compliant.

Place all source code and a screen capture of the output produced by your program in a single PDF document. Submit this document.