CPSC 327

Project 5

Teams: None, please work individually on this project

References:
1. Building and linking to a Static Library lectures and projects
2. Pointers Memory lectures and projects
3. Classes, Objects lectures and projects

Sample Code:
See 2 starter projects on course website

Topics covered by this project;
- Creating and using a static library
- Using pointers to manipulate objects
- Using vectors to hold objects and pointers
- Class Heiarchies
- Abstract Base Classes
- Polymorphism
- Composition

Class Heiarchy
You are developing a class hierarchy for this project. An Abstract Base Class (ABC), 'Smalltalk' defines the hierarchy behavior. Most of your work in this class structure will take place in Smalltalk.

Classes derived from Smalltalk must implement populatePhrases(). A function that initializes the baseclass vector with phrases that are unique to that class type. For instance, Smalltalk_American will populate its internal vector of strings with the american phrases found in constants.h.

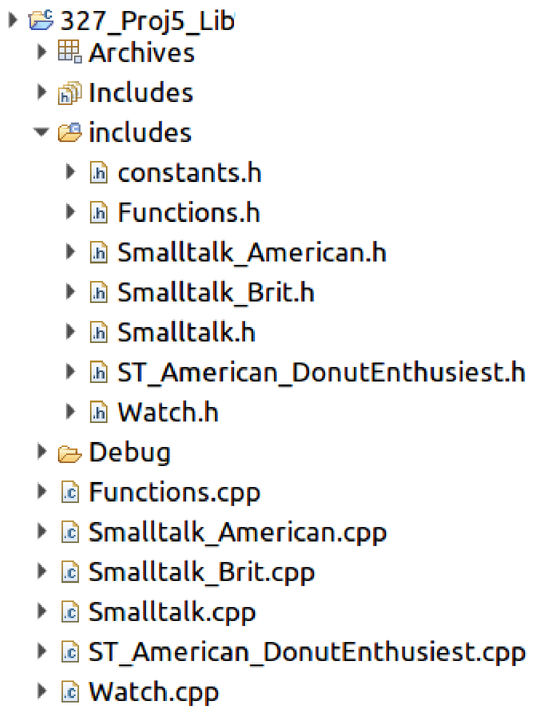
Additionally you are given a complete watch object. You may give or take a watch from any instance of Smalltalk_American, ST_American_DonutEnthusiest or Smalltalk_Brit. Note that watches cannot be created out of thin air, if you give one to an instance you no longer have that watch, the instance does. So <u>this is one case where a shallow pointer copy is appropriate</u>. See Smalltalk.h for further guidance.

Please also provide a function (as specifies in Functions.h and outlined in Functions.cpp) that generates a vector of unique pointers to objects derived from smalltalk. Please pay attention to the hints I've left you in the implementation.

Please compile both projects using the C++11 language standard.

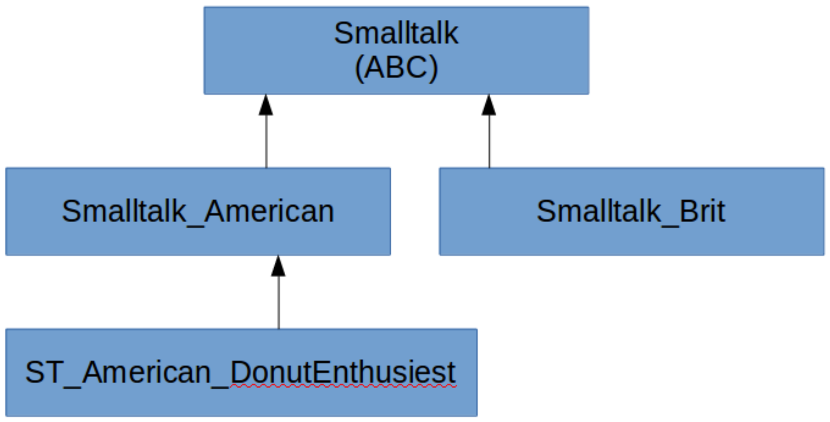
Library

I would like you to develop a static library with the following name and file structure.



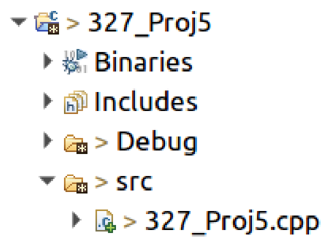
```
327_Proj5_Lib
    Archives
    Includes
    includes
        constants.h
        Functions.h
        Smalltalk_American.h
        Smalltalk_Brit.h
        Smalltalk.h
        ST_American_DonutEnthusiest.h
        Watch.h
    Debug
    Functions.cpp
    Smalltalk_American.cpp
    Smalltalk_Brit.cpp
    Smalltalk.cpp
    ST_American_DonutEnthusiest.cpp
    Watch.cpp
```

All classes inherit publicly. The class hierarchy is as follows;



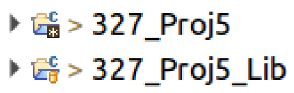
I have given you the header files and some of the implementation.

Testing
Please see the test application with the following name and file structure:



> 327_Proj5
Binaries
Includes
> Debug
> src
> 327_Proj5.cpp

327_Proj5.cpp is a complete tester for the classes and functions you develop in the lib. This application should link statically to the above library. The projects as they appear in the eclipse workspace.



> 327_Proj5
> 327_Proj5_Lib

Submission:
Only the following 5 files. Please do not zip them together, or embed them in a directory structure. Just the 5 files.
Functions.cpp
Smalltalk_American.cpp
Smalltalk_Brit.cpp
Smalltalk.cpp
ST_American_DonutEnthusiest.cpp

Grading:
For each concrete class remember to push as much common functionality as possible into base classes! This cuts down on repetitive code in derived classes.

5% Submission instructions followed
25% getPeople populated correctly with unique pointers
25% populatePhrases implemented correctly
    saySomething cycles correctly through available phrases
25% takeWatch, giveWatch, getTime correct
10% valgrind returns no errors
10% Code style (refactor repetitive code into functions, no magic numbers, no large blocks of empty space, no large chunks of commented out code, pushing as much functionality in base class as possible, appropriate comments, your name at the top of each file, etc.)