In the upcoming class project, you will need to parse XML files and extract relevant info from them. To accomplish this, we will be using the Xerces-C++ Library to parse the XML files with its SAX2 API. According to its author, SAX2 is a general specification "that describes how XML parsers can pass information efficiently from XML documents to software applications".

Below are instructions for installing Xerces-C++ for each OS.

The links provided are for 64-bit operating systems. If you have a 32-bit operating system, you can find the appropriate binaries here:
https://archive.apache.org/dist/xerces/c/3/binaries/

32-bit binaries have the prefix `xerces-c-3.1.1-x86` (and **NOT** `x86_64`)

Technically 3.2.3 is the latest version but as far as I can tell it is only available through source installation (and 3.1.1 should be sufficient for our needs). Using binaries should be easier than building Xerces from source.

Please install Xerces as soon as you can, as you don't want to run into issues once you start the project.

How to set up Xerces-C++:

Windows:

1. Download the latest Windows binary for Xerces at the following link:
   https://archive.apache.org/dist/xerces/c/3/binaries/xerces-c-3.1.1-x86_64-windows-vc-10.0.zip

   The exact instructions for using the binary depend on which IDE you are using. The following instructions in steps 2-4 worked for Visual Studio 2019:

2. After creating your project and unzipping the binary, go to
   `Project → <Project Name> Properties → Configuration Properties → C/C++ → General`

   Then add the path to the Xerces include directory (e.g. C:\Users\croros\xerces-c-3.1.1-x86_64-linux-gcc-3.4\include) to the *"Additional Include Directories"* field

3. From within the Project Properties Window (`Project → <Project Name> Properties`), go to
   `Configuration Properties → Linker → General`

   Then add the path to the Xerces lib directory (e.g. C:\Users\Admin\xerces-c-3.1.1-x86_64-linux-gcc-3.4\lib) to the *"Additional Library Directories"* field

4. Go to
   `Linker → Input`

   Then add the name of the lib file (including the extension e.g. xerces-c_3.lib) to the *"Additional Dependencies"* field

Linux:

1. Download the Xerces-C++ version 3.1.1 binary from here:
   https://archive.apache.org/dist/xerces/c/3/binaries/xerces-c-3.1.1-x86_64-linux-gcc-3.4.tar.gz

2. Untar the file
```
gzip -d xerces-c-3.1.1-x86_64-linux-gcc-3.4.tar.gz
tar -xf xerces-c-3.1.1-x86_64-linux-gcc-3.4.tar
```

3. When compiling, make sure to specify the header (e.g. the `include` directory) and library (e.g. the `lib` directory) file locations with `-I` and `-L` flags, respectively.

   Also specify the `-lxerces-c` flag at the **END** of the compilation command

   Example:
```
g++ -g -I /home/croros/xerces-c-3.1.1-x86_64-linux-gcc-3.4/include/ -L /home/croros/xerces-c-3.1.1-x86_64-linux-gcc-3.4/lib/ main.cpp Student.cpp StudentXMLHandler.cpp Activity.cpp Course.cpp -o test -lxerces-c
```

4. Add the `bin` and `lib` directories to the appropriate path variables. Modifying the path variables is necessary for loading Xerces at execution time:

```
export PATH="$PATH:/<path_to_xerces_directory>/bin"
export LD_LIBRARY_PATH=/<path_to_xerces_directory>/lib:$LD_LIBRARY_PATH1
```

   Example:
```
export PATH="$PATH:/home/croros/xerces-c-3.1.1-x86_64-linux-gcc-3.4/bin"
export LD_LIBRARY_PATH=/home/croros/xerces-c-3.1.1-x86_64-linux-gcc-3.4/lib:$LD_LIBRARY_PATH
```

Mac:

1. The method of installation for Mac that worked for us without issue was installing Xerces through the Brew package manager. To install brew, run the following command:

```
/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install.sh)"
```

2. Once brew is installed, you can install Xerces with the following command:

```
brew install xerces-c
```

   Brew will install Xerces in the location `/usr/local/Cellar`

3. Similar to the **Linux step 3** instructions, you will need to specify header (e.g. the `include` directory) and library (e.g. the `lib` directory) file locations with `-I` and `-L` flags, respectively.

   Make sure to specify the `-lxerces-c` flag at the **END** of the compilation command.

`#include` Syntax:

Regardless of OS, below are the relevant header files to include in the appropriate files of your project. You might only need only a few of these for a given source file, but all header files needed are included below:

```
#include <xercesc/sax2/SAX2XMLReader.hpp>
#include <xercesc/sax2/XMLReaderFactory.hpp>
#include <xercesc/sax2/DefaultHandler.hpp>
#include <xercesc/util/XMLString.hpp>
#include <xercesc/sax2/Attributes.hpp>
#include <xercesc/util/XMLUni.hpp>
#include <xercesc/util/PlatformUtils.hpp>
```