COP2800C Module 4 Practice Exercise

In this practice exercise we will continue revising our box factory application from in order to practice new concepts from this module, including the use of packages.

You will need to work from the command line for part of this exercise and also for the graded assignment. I **highly recommend** that you use the Horizon system to do this since everything is preconfigured, including the required execution search paths.

We are now going to split our classes out into individual files so that we can more easily maintain our code base as our classes get larger and more complex and locate them in a package.

- Select a folder to contain all of the files, I am using my Downloads folder.

1. Copy the Module 3 BoxFactory.java file to your current folder (I have attached that file to this practice exercise for your convenience).
2. Open the BoxFactory.java file in the IDE (I am using jGrasp).
3. Remove the Box class and Color enum from the file and save them in separate sources files. Declare the class and enum as public in their own files:
   - Box.java should now contains only the Box class, declared as "public class Box {"
   - Color.java should now contain only the Color enum, declared as "public enum Color {"
   - BoxFactory.java still contains the BoxFactory class, but the Box class and Color enum have been removed.

Note that if you build the BoxFactory class now, it automatically looks for and builds the Box class and Color enum class (yes, an enum also creates a .class file) from the source files, as long as you have saved them all in the same folder.

4. Add a package statement to each file after the ID header but before the class/enum header:

   package edu.fscj.cop2800c;

Spell this with all lower case.

Using the reverse domain order like this (the reverse of what our Internet domain would be if we had one for the course, e.g. cop2800c.fscj.edu) is the standard naming convention for Java packages that are not part of the language libraries.

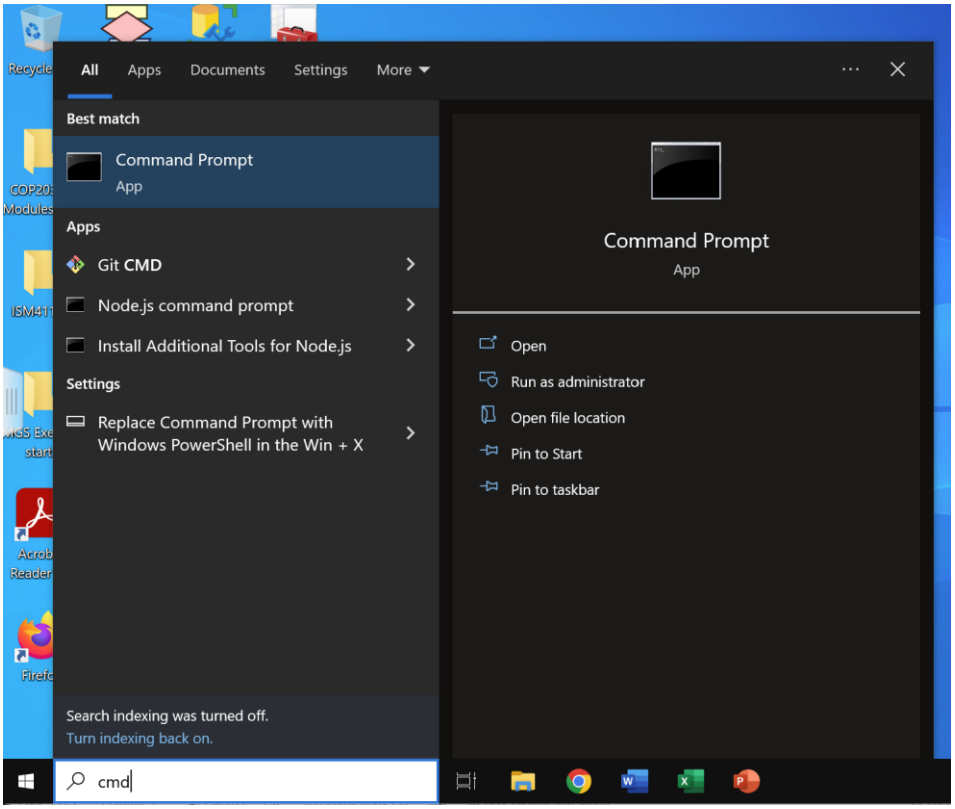
5. Once you have made your changes (assuming you are working in jGrasp), use the "File/Save As" menu to save each file. jGrasp will show a dialog that says the location is not consistent with the package declaration and will offer to remove it for you, let it do this.

Your source files will now be located in your current directory, under the edu\fscj\cop2800c subfolder.

We are now ready to compile and run our code. Again, I recommend completing this entire exercise on the Horizon system if you do not want to get distracted by incorrect execution search paths.

Building and Running from the Command Line

Start by opening the Windows command prompt app. In the screen snip shown here I am typing "cmd" into the Windows search bar; Windows then displays the "Command Prompt" app and I can click on it to start the tool.



Navigate to the top level folder where your source code is located. If you are not on the C: drive, enter C: at the prompt to change your current drive. Then use the cd command at the prompt to navigate to the folder where you will do your work (e.g. cd \users\<youruserid>\Downloads, where <youruserid> is replaced by your login id for the Horizon system).

To compile your code from the command line on Horizon, verify your file folder structure is in place. For our package structure, all .java files must be located in the subfolder structure edu\fscj\cop2800c, which matches our package structure edu.fscj.cop2800c.

Since I am working from my Downloads folder on the system, the subfolder structure is relative to that folder. You can see my .java files located at the bottom of that structure in the cop2800c folder when I run the "dir" command to list the contents of a folder:

```
C:\Users\dasingle\Downloads>dir edu\fscj\cop2800c
 Volume in drive C is Windows
 Volume Serial Number is 82CB-C9A8

 Directory of C:\Users\dasingle\Downloads\edu\fscj\cop2800c

09/25/2022  08:52 PM    <DIR>          .
09/25/2022  08:52 PM    <DIR>          ..
```

```
09/24/2022  09:12 PM               825 Box.java
09/24/2022  09:12 PM             2,073 BoxFactory.java
09/24/2022  09:12 PM               215 Color.java
               3 File(s)          3,113 bytes
               2 Dir(s)  155,217,731,584 bytes free
```

Note: you can also run **dir /s edu** to do a recursive listing of the folder.

Now we need to build the code using the javac command line tool.

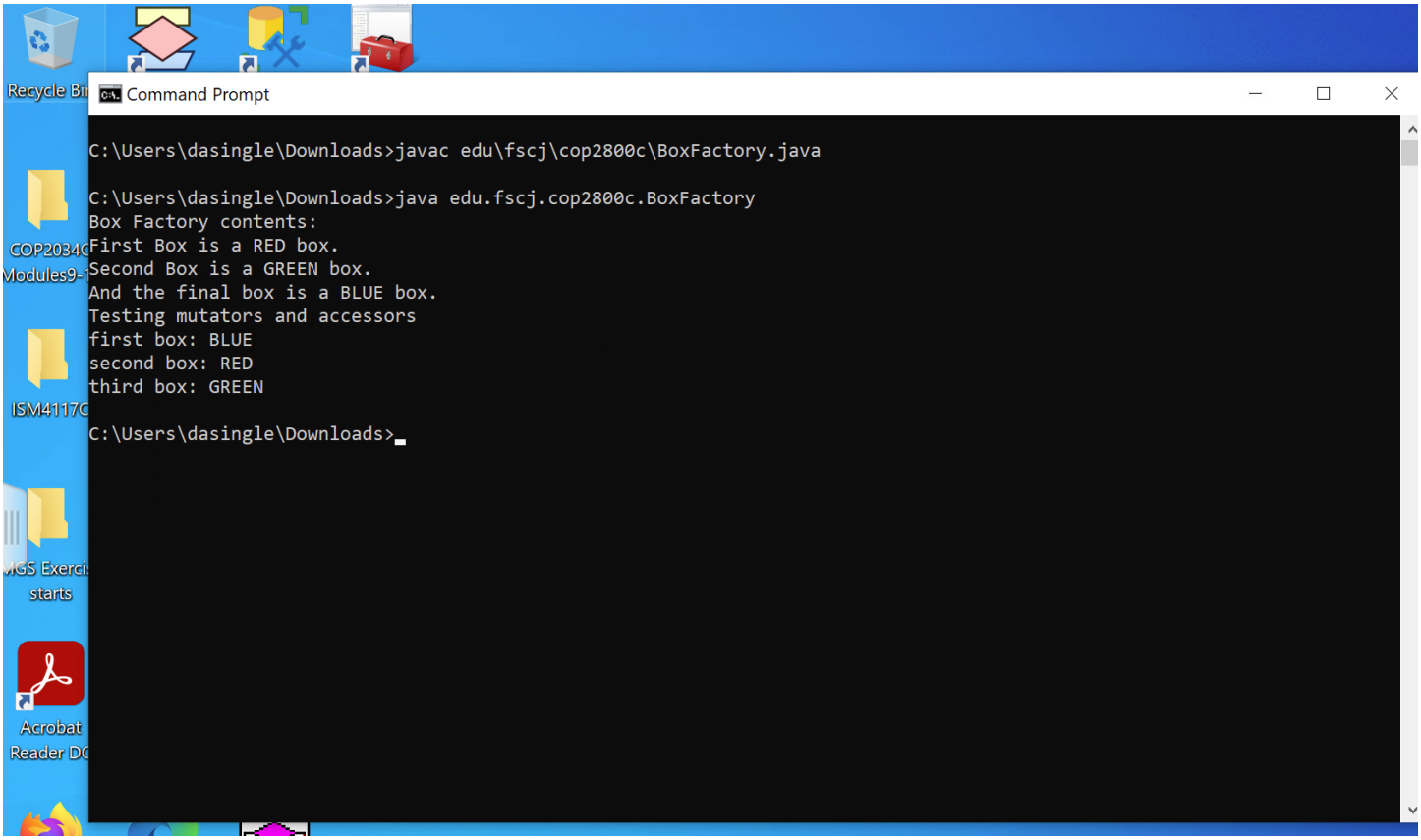
```
C:\Users\dasingle\Downloads>javac edu\fscj\cop2800c\BoxFactory.java
```

Notice that if the compilation is successful we will not see any output. But if we run another dir command we can see that the .class files have been created, these files contain the Java byte code generated from our source code.

```
C:\Users\dasingle\Downloads>dir edu\fscj\cop2800c
 Volume in drive C is Windows
 Volume Serial Number is 82CB-C9A8

 Directory of C:\Users\dasingle\Downloads\edu\fscj\cop2800c

09/25/2022  08:53 PM    <DIR>          .
09/25/2022  08:53 PM    <DIR>          ..
09/25/2022  08:53 PM               664 Box.class
09/24/2022  09:12 PM               825 Box.java
09/25/2022  08:53 PM             2,043 BoxFactory.class
09/24/2022  09:12 PM             2,073 BoxFactory.java
09/25/2022  08:53 PM             1,010 Color.class
09/24/2022  09:12 PM               215 Color.java
               6 File(s)          6,830 bytes
               2 Dir(s)  155,215,867,904 bytes free
```

```
C:\Users\dasingle\Downloads>java edu.fscj.cop2800c.BoxFactory
Box Factory contents:
First Box is a RED box.
Second Box is a GREEN box.
And the final box is a BLUE box.
Testing mutators and accessors
first box: BLUE
second box: RED
third box: GREEN

C:\Users\dasingle\Downloads>
```

For this practice exercise there is no submission, but for the graded assignment you will need to take a screen snip to show you have successfully compiled and run the program from the command line, as shown here (ran this on the Horizon system).



Expected output is as follows:

```
Box Factory contents:
First Box is a RED box.
Second Box is a GREEN box.
And the final box is a BLUE box.
Testing mutators and accessors
first box: BLUE
second box: RED
third box: GREEN
```