CSE 174 - Fall 2019
PROGRAM #6: 30 points – Due Sunday October 6, by 11:59 p.m.

Outcomes

- Write programs that obtain user input
- Write programs that manipulate String objects
- Write programs that use if and else statements for decision-making
- Write programs that use methods
- Format and comment source code that adheres to a given set of formatting guidelines

Scoring

- At a bare minimum, the program you submit must have the assigned source code, and your source code must compile and run without crashing.
- If you do not submit a zip file containing your source code (.java file), your score will be zero.
- If you submit source code that does not compile, your score will be zero.
- If you submit source code that roughly resembles the requirements and it compiles, but it crashes under normal operating conditions (nice input from the user), your score will be reduced by 75%.
- Deductions will be made for not meeting the usual requirements:
    - Source code that is not formatted according to guidelines
    - File and class names that do not meet specifications

	Full credit	**No credit or Partial credit**
Class Boxes (5 points)	The program you submitted solved the problem Boxes.	The program you submitted does not solve or only partially solve the specified problem
Class EarthTemp (5 points)	The program you submitted solved the problem EarthTemp.	The program you submitted does not solve or only partially solve the specified problem
Class Cylinder (15 points)	The program you submitted solved the problem Cylinder.	The program you submitted does not solve or only partially solve the specified problem
Format output as specified (5 points)	Your output is formatted as specified, including proper spacing, spelling, rounding values to the specified number of places, and so on	You did not follow some or all the requirements for output

Assignment

1. In a class named `Boxes`, write a program that displays three 5x5 boxes using the selected characters.

2. In a class named `EarthTemp`, write a program to take a depth (in kilometers) inside the earth as input data; compute and display the temperature at this depth in degree Celsius and degree Fahrenheit.
3. In a class named `Cylinder`, write a program that calculates:

   a) the area of a circle, b) the area of the surface of a cylinder, or c) the volume of a cylinder.

   First, the program asks the user to input one of the three possible options, if the user enters a different option, the program will show an error message and end the program. For each option, the program will ask the corresponding measures such as radius, height; then it will calculate and display the result of the operation.

Requirements

- In class `Boxes`,
  - Create a method which draws one box given a character as argument.
  - Call the method `draw`, and this method get a char input and only displays a box.
  - The program must call the `draw` method three times with the corresponding characters.
  - If the user enters a String with a length more than 3 characters you need to prompt the user with "Invalid Input!" message and terminate the program.
  - Only a string with the length of three is acceptable meaning no spaces between characters.

- In class `EarthTemp`,
  - Create two methods:
    - `getCelsiusAtDepth` – Calculates and returns the Celsius temperature at a depth measured in kilometres.

      Celsius = 10 * depth + 20
    - `convertCelsiusToFahrenheit` – Converts a Celsius temperature to Fahrenheit.

      Fahrenheit = 1.8 * Celsius + 32

- In class `Cylinder`,
  - The only valid options for the initial input are a, b, and c (or in uppercase i.e. A, B, and C). Other options will raise an error message, even those which start with the character of a valid option i.e. car, boat, apple also raise an error message.
  - The area of a circle must be calculated in a method which returns a double value, given the radius, and you can call it `circArea`.
  - The area of a cylinder must be calculated in a method which returns a double value, given the radius and height, and you can call it `cylArea`. This method must call the

area of acircle method when calculating the area of the surface of a cylinder. To calculate the area of the surface of a cylinder, use the following formula:

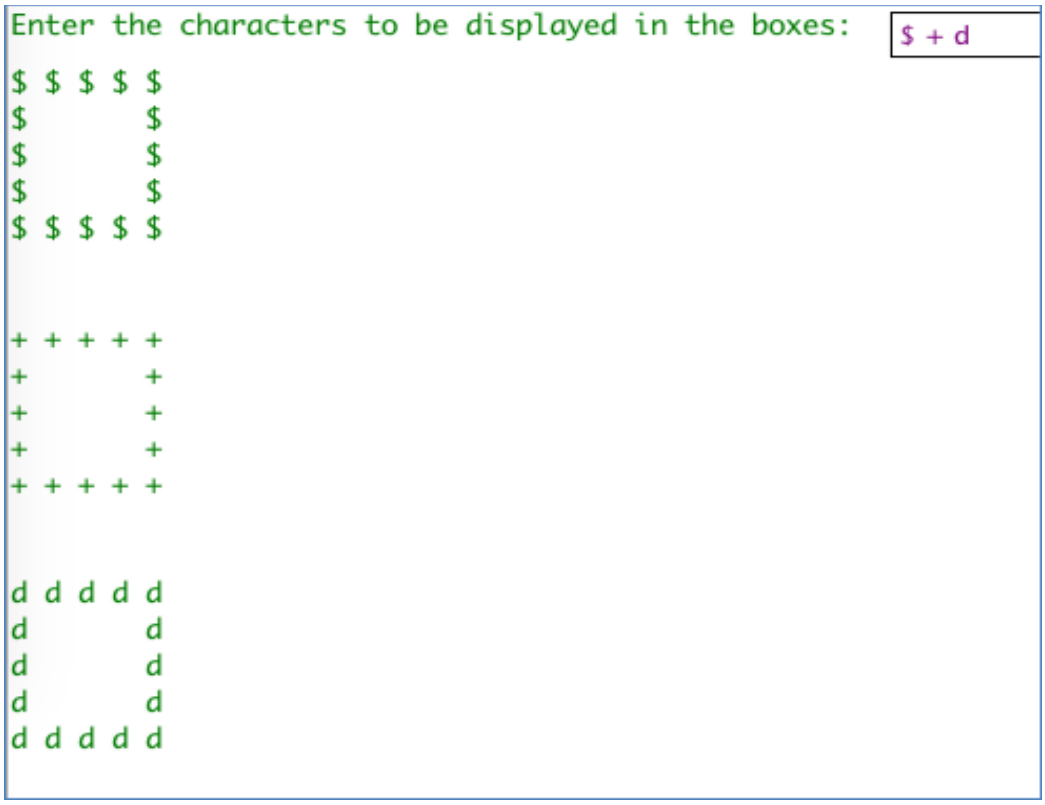
- S = 2πr^2 + πdh
- where `r` is radius, `d` is diameter, and `h` is height.

- The volume of a cylinder must be calculated in a method which returns a double value, given the radius and height, and you can call it `cylValume`. This method must call the area-of-a-circle method when calculating the volume of a cylinder.
- The input values for the circle or cylinder measures can be of type double.
  - The output of the area or volume will be presented with three decimal places.

Sample run

Your program should match this format as closely as possible. Note that some text shown inside the rectangles is there because the user typed it. You are not supposed to print those.

Class Boxes



Class EarthTemp

Class Cylinder

```
-- Menu --
a) Area of a circle
b) Area of the surface of a cylinder
c) Volume of a cylinder
Enter your choice: m
The selection is not correct. Program terminated.
```

```
-- Menu --
a) Area of a circle
b) Area of the surface of a cylinder
c) Volume of a cylinder
Enter your choice: Car
The selection is not correct. Program terminated.
```

```
-- Menu --
a) Area of a circle
b) Area of the surface of a cylinder
c) Volume of a cylinder
Enter your choice: a
Enter the radius 15.0
The area of the circle is 706.858
```

```
-- Menu --
a) Area of a circle
b) Area of the surface of a cylinder
c) Volume of a cylinder
Enter your choice: B
Enter the radius 10.0
Enter the height 2
The area of the surface of the cylinder is 753.982
```

```
-- Menu --
a) Area of a circle
b) Area of the surface of a cylinder
c) Volume of a cylinder
Enter your choice: C
Enter the radius 20
Enter the height 6.0
The volume of the cylinder is 7539.822
```

Follow these steps to submit your work:

1. Create an empty folder named program6.
2. Put copies of your three source code files (.java) in the program6 folder. Do not put any other files in that folder. There should be exactly three .java files.
3. Compress the folder to create a zip file. Be sure it ends with .zip.
4. Submit only the program6.zip file to the Canvas website.

Note: If you submit your work and decide to modify one of your programs, you need to resubmit a new zip file containing all three source code files (even if you only modified one of them). Do not rename your source code files. Do not rename the zip file. Canvas may add a number to the name of your zip file. That is fine. But you should keep all filenames the same.