Problem Solving Steps

Program Assignment #2

**Problem #1**

* Writing a MAIN class that will create three objects out of our classes Father, Daughter, and Son and the all have methods in each class and attributes and all of them they followed the OOP instructions.
  1. Son inherited features like hair color and eyes color from the father they have same features.
  2. Polymorphism Runtime: Inside Son class or Son.java, line 5. I made a function called eat() and this function will override the Father’ function eat which we will see that Son eats a lot more than his dad.
  3. Polymorphism Compile Time: Inside Father class or Father.java, line 19. I made two functions with same name but different data taking which will overloading. The first function talk shows that Dad doesn’t like to talk a lot and the second function talk(String something) will take some kind of input “overloading” and I used it in the main.
  4. Abstraction: Mother class or Mother.java shows you how to Abstract class and Abstract method are and that I can’t defined methods but when I used the Daughter class. This class shows you how to implemnt and define that abstract method into the sub class.
  5. Encapsulation: I did use Daughter class for encapsulation which is basically is wrapping the data (variables) and code acting on the data (methods) together as a single unit. In encapsulation, the variables of a class will be hidden from other classes which I used private attributes in this class, and the only way to read this informations or can be accessed only through the methods of their current class. Therefore, it is also known as data hiding. I made getAge, getEyescColor, getHairColor, getName which I called later in the Main class which shows me the daughter name, age, hair color, eyes color.

**Problem #2**

* What I did is creating a Main class that will execute all the functions that I have created in Mammalia class. I made sub classes for the Mammalia class which is a tree of classes that inherited from that class. I have made legs, tails, brain, neurons, precision, birth date, favorite food as variables and as required in the main class “Mammalia” and I made multiple methods as required like eat, walk, sleep, give birth functions and set a default message for each if that functions is been used also I made sure my main class it has default constructor that has neurons, precision, and favorite food as required and we’re going to use it later in part D.
* I created 5 animals of each family, and we have 22 families as we can see which I ended having 110 animals in my main class then after creating this animal I made sure that I set neurons, precision, and favorite foods values for each animal.
* In Part D I made changes to the default value for 20 different animals which I made a function called firstChange and it will allow me to change the values of three things “ neurons, precision, and favorite foods” and I made sure that I have printed the values before I change it and after I changed it as the instructions says. Then I started adding some new features like speed, hunting habit, hunting process as they required in the instructions and I only did it to 10 animals only as the requirements says and make sure these animals they are between 6-8 level which I have chose Carnivora family and Cetartiodactyla family which both located in level 8. I made some changes into their speed, hunting habit and hunting process and I created a random values to indicate that.
* Last step is outputing the values into an output file which I used java.io.FileWriter to do that and printed my output into “allData” file. I made sure I closed the the file at the end of the program.

**Problem #3**

* In this question I built a calculator and my main goal is to get the try and catch or Exceptions handling working with the following example:
  + Syntax error: Missing ( a bracket
  + Syntax error: Multiple equal sign
  + Syntax error: Multiple variable (more than one)
  + Syntax error: Missing equal sign
  + Runtime errror: devided by zero

First thing in this program is taking the data from the user as String using the normal **Scanner** after that taking the String then start spiting the String into three pieces: numbers, operators, and variables and I made an array for each. In order for me to filter these out of the string I used “.split” which I use regex which regular expression which a way to take filter out the input Example:

String[] variables = in.split("\\d|\\+|\\-|\\\*|\\%|\\=|\\(|\\)|\\/");

which \\d stand for digital numbers and the reset is filtering the signs or operators out of the text and then save the elements into an array called variables…

next step is making condition to start throwing error if we see any into the user input.

So I basically made a if statement tells the program if there is more than one variable into the variables array throw an error saying the following: SYNTAX ERROR: MORE THAN ONE VARIABLE.

Now I’m done with the first exception then now I will start doing the next steps which see the equal sign if exist or NOT or If I have more than one. I did a loop going through the operators arrays and I made a variable to count the number of equal signs contains that array. So if they are 0 equal sign then throw error : SYNTAX ERROR: ‘=’ EXCEPTED

IF ELSE (if they are more than one equal sign then throw an error saying the following:

SYNTAX ERROR: UNEXPECTED ‘=’.

Now I have two more things is finding if I have enough bracket or not which I go through the operators array using for loop again and made a variable called counterBRACKET and ask the if the array “(“ contains using (.contains) if YES then add one to my counterBRACKET and keep going and ask again if this array contains “)” again and if YES subtract ONE from my counterBRACKET that way I called tell if there is any missing bracket or NOT. If there is any bracket I will be either in minus or going above the number ZERO that means I have to throw new error saying: SYNTAX ERROR: ‘)’ EXPECTED.

Last thing is the diving by zero which lets say I have put the condition into the function which will take two elements A and B and if B == 0 then throw RUNTIME ERROR with the following message: RUNTIME ERROR: DEVIDE BY ZERO OCCURRED.