Day 2 - Java Programming Assignments

Strings

1. **Count vowels** – Input a string and count how many vowels it contains (ignore case).
2. **Check palindrome** – Input a string and check whether it reads the same forward and backward.
3. **Reverse string** – Reverse the string without using StringBuffer.reverse().
4. **Word count** – Count the number of words in a string (words separated by spaces).
5. **Remove whitespace** – Remove all spaces from the input string.
6. **Replace character** – Replace all occurrences of a given character with another character.
7. **Character frequency** – Count the frequency of each character in a string.
8. **Extract digits** – From a string, extract all numeric digits and display them as a single string.

Method Overloading

9. **Add numbers** – Overload methods to add two integers, two doubles, and two floats.
10. **Find maximum** – Overload a method to find the maximum of two or three numbers.
11. **Calculate area** – Overload methods to calculate the area of a square (1 parameter) and rectangle (2 parameters).
12. **Greet person** – Overload methods to greet a person by first name or full name.
13. **Factorial calculation** – Overload methods to calculate factorial of a single integer or an array of integers.
14. **Interest calculation** – Overload methods to calculate simple interest and compound interest.

Wrapper Classes

15. **String to number** – Convert a string to integer, double, and float using wrapper classes.
16. **Number to string** – Convert an integer or double to a string using wrapper classes.
17. **Max & min values** – Display max and min values of integer, float, and double.
18. **Compare integers** – Compare two integers using Integer.compare().
19. **Character analysis** – Count uppercase letters, lowercase letters, and digits in a string using Character class methods.
20. **Auto-boxing & unboxing** – Demonstrate auto-boxing and unboxing using arithmetic operations.

Inheritance

21. **Vehicle & Car** – Parent class Vehicle with speed and color. Subclass Car accesses parent properties.
22. **Animal hierarchy** – Parent class Animal with name and age. Subclasses Dog and Cat add breed.

23. **Shape & Rectangle** – Parent class Shape with length and breadth. Subclass Rectangle calculates area.
24. **Employee & Manager** – Parent class Employee with name and salary. Subclass Manager adds department.
25. **Person & Student** – Parent class Person with name and age. Subclass Student adds grade.
26. **BankAccount & SavingsAccount** – Parent class BankAccount with accountNumber and balance. Subclass SavingsAccount adds interestRate.
27. **Device & Smartphone** – Parent class Device with model and price. Subclass Smartphone adds OS type.
28. **Book & EBook** – Parent class Book with title and author. Subclass EBook adds fileSize and format.
29. **Appliance & WashingMachine** – Parent class Appliance with brand and power. Subclass WashingMachine adds capacity.
30. **LibraryItem & Magazine** – Parent class LibraryItem with ID and title. Subclass Magazine adds issueNumber and month.