3. What are character streams? Present the primary classes to manipulate character streams in Java.

4. What are standard input and output streams? Present the main methods to manipulate data from standard input and output devices.

5. Write a program in Java that reads a mark as an integer number between 0 and 20 from standard input and classifies the level of the mark based on the following table:

Level	Mark
Fail	0-9
Average	10-12
Above average	13-14
Good	15-16
Excellent	17-18
Outstanding	19-20

6. Write a program in Java that computes the Euclidean distance of two given points (a_1, b_1) and (a_2, b_2). The four coordinates a_1, b_1, and a_2, b_2 are real numbers read from the standard input.

7. Write a program in Java that reads n real numbers from the standard input and prints to the standard output their mean (average value) and sample standard deviation (square root of the sum of the squares of their differences from the average, divided by $n - 1$).

8. Write a program in Java that computes the sum of the squares of n integer numbers getting from the standard input $(n > 1)$.

9. Write a program in Java that finds the string "OOP course" in a string given by the user from the standard input.

10. Write a program in Java that reads n integer numbers ($n > 0$) from the standard input, then print all the numbers that are greater than the average.

11. Write a program in Java that reads n integer numbers ($n > 0$) from the standard input, then print the number that occurs most frequently.

12. Write a program in Java that calculates the value of the following function:

$$f(x) = ax^n + bx^m + c$$

Where:

- a is an even number typed from the keyboard,
- b is an odd number typed from the keyboard,
- c is a random number from 0 to 1000,
- n and m are positive numbers typed from the keyboard,
- Calculate and print the result on the screen.

13. Write a program in Java that performs the following tasks:

- Enter from the keyboard a natural number n ($n>1$).
- Enter two vectors, a and b, from the keyboard, where the dimension of a and b is n, and the data type of a and b is floating-point.
- Calculate the angle of the two vectors a and b.

14. Write a program in Java that manages the employee information of a company as follows:

- Number of employees (n) is entered from the keyboard.

- Information about each employee is entered from the keyboard, including:
  - Employee ID;
  - Employee full name;
  - Employee department;
  - Basic salary;
  - Extra salary.

- Information of n employees is saved into a text file named employees.txt.

- Information about the total income of each employee is read from the employees.txt file and calculated by the formula:

$$income = basic\_salary + extra\_salary * 2.5$$

- Print out to the screen the following information of n employees:
  - Employee ID;
  - Employee full name;
  - Employee department;
  - Employee income.

15. Write a Java object-oriented program to manage the ICT 3 class using inheritance as follows:

- Read the following information entered by the user from the keyboard and save into a text file:
  - The IDs and names of the courses;

o The IDs and names of lecturers for each course;

o The IDs and full names of the students;

o The midterm and final mark for the students of each course.

▪ From the saved text file, read the list of students. If the student has the average final mark of all courses >= 10 and no course with the midterm mark <= 7, then display to the screen their full name with the status "Grade passing student", otherwise, display to the screen their full name with the status "Retake student".

16. Write a Java object-oriented program that contains four classes: Person, Lecturer, Student, and Course with the appropriate OOP principles and relationships between these classes to manage the three ICT courses OOP, WEB, IP as follows:

▪ For each course, the course name is inserted directly into a text file. Others are entered from the keyboard and saved into a text file. Others include the number of students n, the number of lecturers m (n and m are natural numbers >1), the list of lecturer names, the list of student IDs, the list of student full names, the list of student attendance marks, the list of student mid-term marks, the list of student final marks and the list of final course marks (calculated by averaging attendance, mid-term and final mark with ratios 10, 40, 50, respectively).

▪ From the saved text file, read the list of courses. For each course, display the course name, display the list of lecturers, then different lists of the students (each displayed student

contains student ID, full name, and all mark scores: attendance, mid-term, final mark, and final course mark) with their classification as follows:

(a) The list of average students with attendance marks < 6 and final course marks < 10.

(b) The list of good students those have attendance mark >= 10, mid-term <= 15, final mark >= 16, and final course mark >= 13.

17. Write a Java object-oriented program to manage the mark track of math courses in bachelor program as follows:

- The number of students n is entered from the keyboard.

- The list of students with information such as full name, date of the bird in format month/date/year, the math course names, and corresponding marks in the last two years in the bachelor program are entered from the keyboard and saved into a text file.

- From the saved text file, read the list of students having an average mark of all the math courses >= 15, then display to the screen the student information with the title "The very good math student".