

[Write on your own sheets of paper. On each sheet, on the **front**, write in the **top right corner** your **lastname, firstname(s), group id** and **B**. Leave a **2cm margin** at the left on the front page / at the right on the back for stapling. Closed book. Time: 30 minutes]

1. [2p] What will be printed when the following java code fragment is executed. Motivate your answer.

```
public class BClass implements Tripler{
    int val;
    public BClass(int val){ this.val = val; System.out.println("Ctor BClass: " +
val); }
    public int tripleIt (int val) {
        return val * 3;
    }
}
public class CClass{
    protected static double SEVEN = 8;
    public CClass (double two) {
        System.out.println("Ctor CClass: " + SEVEN);
        SEVEN = two;
    }
}
public interface Tripler {
    int tripleIt(int val);
}
public class ZClass extends CClass implements Tripler{
    public static final int ONE = 1;
    public static float TWO = 2;
    ZClass() { super(ONE); System.out.println("Ctor ZClass(): "
        + ONE + " " + SEVEN); }
    public float doIt(int i) { return TWO * i; }
    public int tripleIt (int val) throws UnsupportedOperationException {
        throw new UnsupportedOperationException("Not implemented");
    }
    public static void main(String[] args){
        Object o1 = new ZClass();
        Object o2 = new ZClass();
        BClass b = new BClass((int)TWO);
        SEVEN = ((ZClass)o1).doIt(-1);
        System.out.println("ZClass: " +
            ((ZClass)o2).doIt(7) + " " + ((ZClass)o1).SEVEN + b.tripleIt(1));
        int val = ((ZClass)o2).tripleIt(2);
        System.out.println("Done");
    }
}
```

2. [1p] Draw the class diagram for the code of exercise 1.
3. [1p] What is the `finally` clause used for and what should one put in such a clause?
4. [2p] Describe the methods of an applet.
5. [1p] What does unit test mean?
6. [1p] How many methods are defined in the `Serializable` interface? Why?
7. [1p] What can be an argument for a `catch` block and what has one to write in a `catch` block?
8. [?]p How many lectures did you attend?

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Mines are coming!

On a river there are floating mines coming down the stream. The enemy tries to destroy a bridge which crosses the river. All what happens is illustrated on the console. It is a process carried out in steps, according to the following rules:

- Mines are coming from the top to the bottom of the screen, as that is the direction in which water flows. Mines in the water are depicted by 'M' letters.
- Every mine moves at every step towards the bottom with one position in one of the directions: SW, S or SE, at random.
- All the mines the enemy possesses are initially at the top. The number of mines stacked for a column is depicted by a decimal digit. At every step one more mine is released from the stack.
- The initial number of mines is set at random for every column.
- You have boats in the water, symbolized by 'B' letters, placed initially at random positions. People in the boats can grab the mines located in their neighborhood (there are 8 positions in the neighborhood – imagine a boat as placed in the center of a 3 by 3 square.).
- At any step, if not in the path of a mine, a boat will move one step towards the path of a mine, if no other boat is in that path.
- The number of boats is one quarter of the total number of mines.
- If a mine is picked from the water, it disappears.
- If a mine gets on a position with a boat, the boat explodes, and the mine and boat are both disappearing (i.e. they drown).
- The bridge is located at the bottom and it is depicted by 'P' and '=' symbols. The bridge is damaged when a mine hits one of its pillars. After the hit, the mine disappears and the pillar is replaced by water ('.').
- A step is taken when the user presses the 'Enter' key. First, mines are moved, and then the boats operate.
- The process ends when there are no more mines to release or in the water.

The water area is symbolized with dots ('.'). At the beginning of the game, and also after each step you should print to `System.out` – *text mode* – the current configuration – see Fig. 1 below.

Draw the class diagram and develop a java program to simulate this game. Don't forget to briefly document it.

Fig. 1 Example of a possible start configuration.

```

      5      7      3      1      9      3      4
.....
.....
.....B.....
.....B.....
.....B.....B.....
.....B.....
.....B.....
.....B.....B.....B.....
.....B.....
.....B.....B.....B.....
.....B.....
=====P=====P=====P=====P=====P=====P=====
Press Enter....

```