

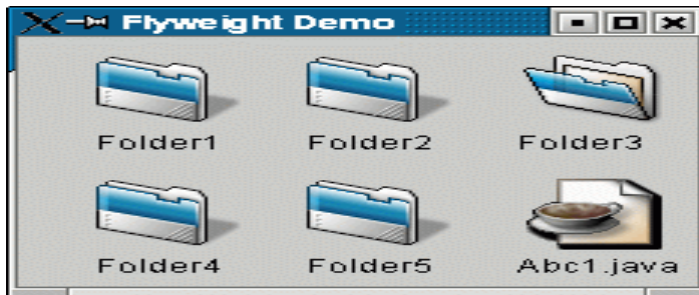
## Practical Object oriented design (Factories, Flyweight & Chain of responsibility)

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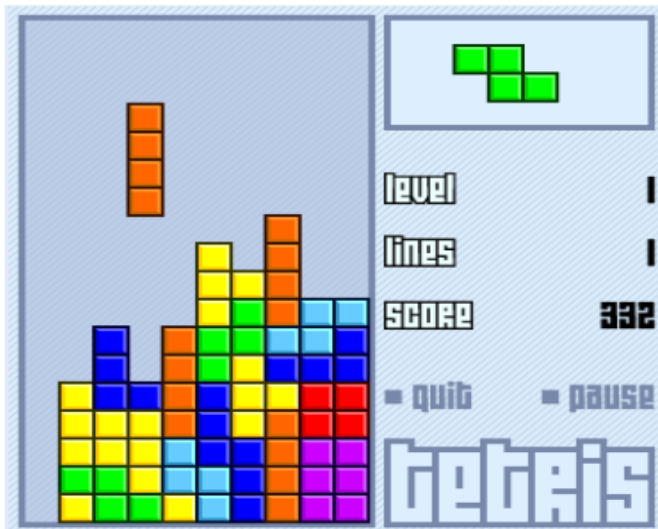
Solve the following problems.

### Problem1: File Explorer View

Develop an application that displays a large number of icons as shown below. The types of icons include folder icon(for all the directories), java icon(for all files with .java extension), text icon(for .txt files), picture icon(for pictures of all types), pdf icon(for all files with .pdf extension) and Unknown icon(for any other files).



### Problem2: Game of Tetris



You have to design a Tetris game which uses a 20x10 scoreboard, in upright form. From its ceiling, blocks fall down. The blocks have different forms (rectangular, square, Lshaped polygons). The player can rotate the blocks while they fall down. Once a block

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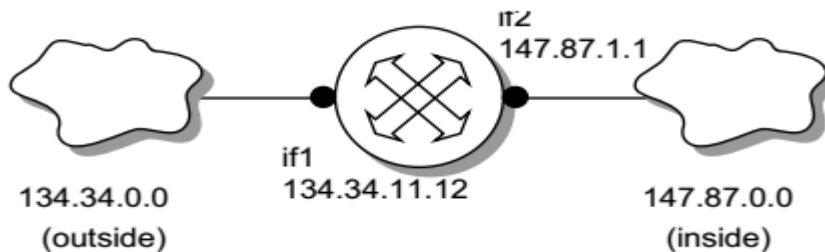
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touches the ground, it is fixed where it landed. Only one block falls at any time. Once the current block has been fixed on the ground, a new block appears below the ceiling.

- Design the class model of the game. Consider a main class for the game, a game scoreboard, and a class hierarchy for blocks.
- Design an AbstractFactory or Factory method pattern to create block hierarchy. Use random generator to determine the concrete block type that appears next.

### Problem3: Router Filter

Suppose a router having the duty of forwarding packets from one network to the other. However, the router must refrain from forwarding of packets meeting specific criteria in terms of filter lists. A sketch of a simple network might look like:



An imaginary filter list associated to interface if1 might look like:

// p/d	proto	src host/nw	src prt	dst host/nw	dst prt
deny	any	123.123.1.1	0	147.87.0.0	0
permit	tcp	0.0.0.0	0	147.87.64.7	80
permit	udp	0.0.0.0	0	147.87.1.1	53
permit	tcp	0.0.0.0	0	147.87.62.5	21
deny	udp	0.0.0.0	0	147.87.0.0	0

Upon the receipt of a packet at interface if1, the interface of the router first checks its associated filter list. If the filter list decides that the packet can be routed, then the interface passes the packet to the forwarder. Design an application to meet filtering requirements.