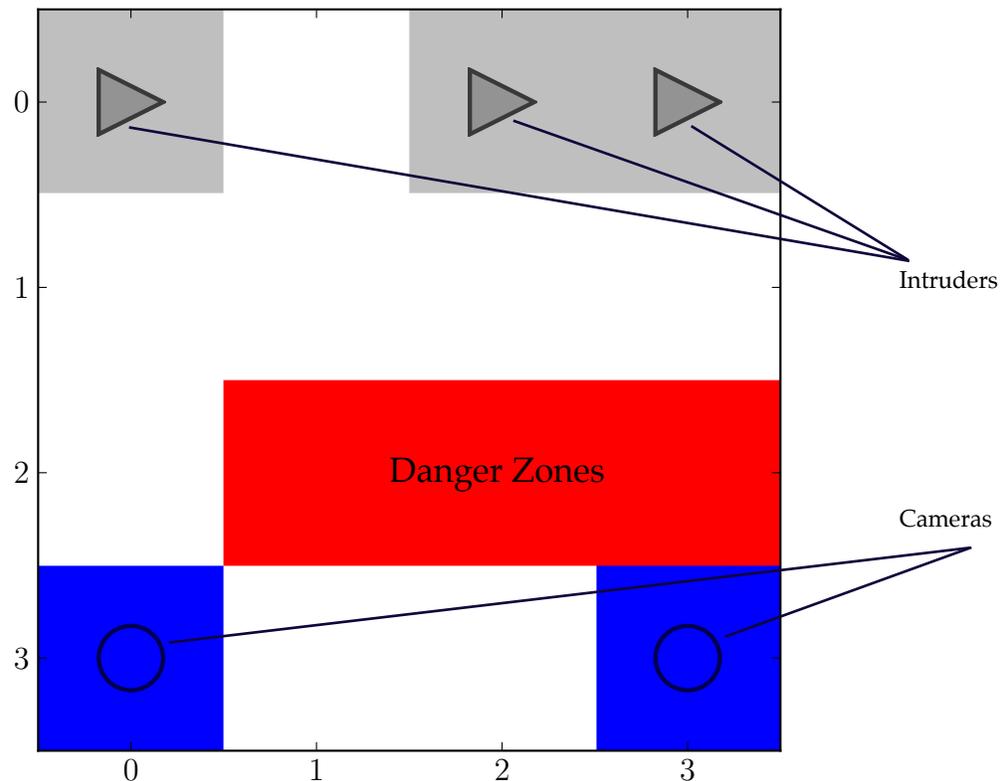


DISCRETE INTRUDER MONITORING DOMAIN

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Task: Formulated as an MDP, the task is to guard danger zones using cameras (●) so that if an intruder (▶) moves to a danger zone, at least one camera is pointing at that location. The episode is finished after 1000 steps. The initial grids of cameras and intruders are highlighted with the same color code.

State: $[C_1, C_2, \dots, C_n, I_1, I_2, \dots, I_m]$, where there are n cameras and m intruders are in the world (in the above example, $n=2$ and $m=3$). Each C_i and I_i correspond to the position (X,Y) of the camera and the intruder correspondingly.

Actions: $\{\uparrow, \downarrow, \rightarrow, \leftarrow, \bullet\}^n$ corresponding to the 4 cardinal movements in the grid and the “hold” action. There is no noise in the movement. The policy of the intruder is currently uniform random. It can be changed through the function **IntruderPolicy()**

Reward: -1 for every visit of an intruder to a danger zone with no camera present.

Maps: There is a simple text file that can define a map. Current maps are located under **IntruderMonitoringMaps** directory. Each file is a matrix with elements 0 (empty), 1 (intruder), 2 (camera), and 3 (danger zone).

Installing Notes: You need Numpy, Scipy, and Matplotlib. Having Latex is a bonus. After installation, please change `TEXPATH` and `HOME_DIR` in `Config.py` to the latex bin directory and a temporary path with write access on your local machine. If you have further questions please contact us through emails above.