

Museum security

Your security company has a contract with the Guild of Art Galleries to provide video surveillance at several locations. The cameras that you will use are too big for the taste of museum curators, who want to have as few cameras as possible interfering with the art exhibitions.

The camera resolution is good up to 25 feet when still, and up to about 8 feet when scanning horizontally. Besides, the angle covered by the camera lens is approximately 50 degrees.

Most museums try to maximize the area available to display paintings and other exhibits, so their floor-plans are quite convoluted, with several panes standing in the middle of a room at odd angles, and corridors connecting exhibitions. Although rooms can be long (up to 100 feet), opposite walls are never more than 30 feet apart so that visitors do not have to walk unnecessarily. All walls and panes are flat.

Your task is to design a procedure to place fixed and/or moving cameras in choice locations around the museum (curators prefer them in the corners) in order to provide the best possible coverage during the night. To validate, use your procedure on any publicly available museum floor-plan that includes the placement of panes. (e.g., <http://www.spjc.edu/central/museum/floorplan.htm>)

The Mona Lisa predicament:

Some museums have a particular item that requires extra attention during the day to protect it from possible vandals. Explain whether your proposed strategy can be easily modified to accommodate this extra security concern.

The stingy curator problem:

Some museums have a limited budget that may not suffice to install/maintain all the necessary cameras. Discuss a strategy to place a limited number of cameras in an optimal way, then propose possible additional security precautions.