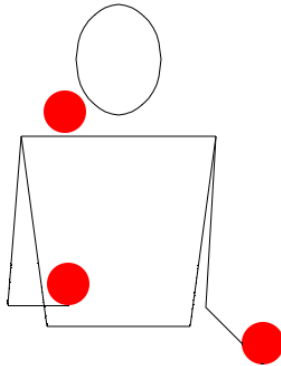
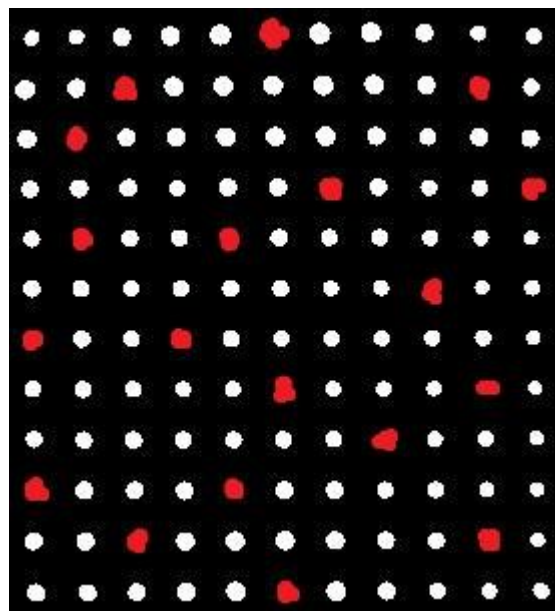


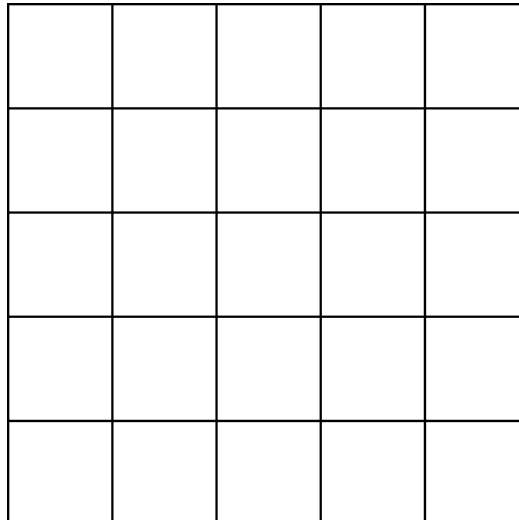
1. Juggling is an art form that a human can learn with practise. But imagine a robot trying to learn juggling. The best way to do it is understand the pattern of the juggler and reproduce it as efficiently as possible with minimum deviation and smooth repetition. Here we have an animation of three red balls being juggled by an amateur juggler. You will notice that the balls follow two constant trajectories. Your objective is to trace these paths of motion and show them in the original animation using MATLAB. Shown below is a snapshot of the animation. The output should be a gif file with the traced out path. (25 points)



2. Given below is the grid of white dots. Assume that the top left corner is the origin, where your bot is stationed. The red dots represent landmines which the bot can detect from an adjacent white dot, which is safe. Write MATLAB code to help the bot traverse the **shortest, landmine-free** path from the origin to any **point** (x,y) on the grid. The **point** here is a white dot, while x represents the row and y represents the column. The bot cannot traverse diagonally. Marking the points that the bot traverses would be enough. (25 points)



3. The simplest form of coding is to assign frequencies to characters and transmit accordingly. Given are 5 samples of audio for 5 symbols 'a','b','c','d','e'(named 'a.wav', 'b.wav', etc) respectively. Your objective is to decode a message (msg.wav) using MATLAB and generate the text as output. (15 points)
4. Encryption is a key element to ensure secure transmission. A simple way to do that would be to embed text into a seemingly trivial audio file and have it decoded using methods known only to the transmitter and receiver. You have been given an audio file ('dec.wav') into which a **fifteen-lettered sentence** has been embedded. In addition, the text has been ciphered using a famous, ancient Roman method. Your objective is to decode and decipher the text using MATLAB. There are no spaces in the sentence (Hint: four cubes might help, lateral thinking might not!) (15 points)
5. Write a MATLAB program to count the number of squares in the given figure. (15 points)



6. A photograph of the moon was taken from earth. However, due to noise and blurring, the image is corrupt. Your objective is to remove the noise and blur using appropriate filtering methods.(5 points)

