1. Canny has two thresholds that control the edge thresholding process. What is their purpose?

    Two threshold in canny filter is minval and maxval. If Any edges with intensity gradient more than maxval are definitely to be edges and those below than minval are sure to be non-edges. If something lies between maxval and minval, determine with the connectivity, if lines are connected, then consider it as part of edges.

2. What is the purpose of the aperture parameter? What is the result of changing it from 3 to 5, 7, 9 or greater?

    The purpose of aperture parameter is for sobel operator. It is the size of sobel kernel used for find image gradients. If changing the value of aperture value from 3 to 7, it works fine and increasing the value of aperture parameter makes more line when creating canny filtered gray images. however if it increased more than 7 then it aborted. Aperture size should be odd between 3 and 7 in function. If the value of aperture increases, then it shows more edge detected lines.

3. The Hough transform has two parameters that specify the resolution of the accumulator. Their default values are 1 and $\pi/180$. What is the effect of increasing the first and reducing the second?

    Using $r_\theta = x_0 \cdot \cos\theta + y_0 \cdot \sin\theta$ this equation, plane(rho,thetha) graph and find the intersection.   Line can be detected by finding the number of intersection between curves. The more curves intersecting means that the line represented by that intersection have more points.

    First parameter of the hough transform is rho and second parmeter is thetha. Rho is the distance resolution of the accumulator in pixels and theta is the angle resolution of the accumulator in radians. As a result of the images printing, There's not much differences between normal value one ,one increasing the value of rho, one decreasing the value of thetha and one increasing rho and decrasing thetha at the same time. However, I can see that increasing rho split the horizon in to small lines so it looks a bit scattered but when decreasing the value of tetha makes the connecting horizon so it looks more longer horizon compared to increasing the value of rho. And also could observe that decreasing the value of thetha make more lines in the image.

    For bigger rho, it filter a lot of small lines. However, big thetha gives more shorter lines

4. The Hough transform has a pair of parameters that determine the minimum length of a

line that can be accepted, and the maximum gap between two segments if they are to be considered part of the same line. What is the effect of changing these values?

Two parameters are that minLineLength and maxLineGap. If increasing the value of maxLineGap, then it doesn't make a proper horizon because It can be drawn the another circlish line within MaxLineGap. So It won't draw the horizon if increase the value of the maxlinegap. And also increasing the value of the minlinelength also draw the line quite similar to the one increasing the value of maxline gap. If increasing the value too much, then there's no lines so can't draw the line with. However if there's a few then you can draw but depends on the max line gap so it won't draw the line weirdly. So that Those two values should set appropriate values to get the real horizons.

5. How close are the computed horizons to where you think the horizon should be? What might cause any discrepancy?

There's some difference between what I think the horizon should be and the computed horizons. I think the reason is the way of computing horizon is that just drawing the largest line in the image that can draw so it make sense even if it's not correct with horizon what I thought. But the performance is pretty good so I can see the computed one is the real horizon.