

Midterm review: Cameras

- Pinhole cameras
 - Vanishing points, horizon line
 - Perspective projection equation, weak perspective
 - Lenses
 - Human eye
- Sample question: “What property must 3D lines have so that they converge to the same vanishing point in an image? Assume standard perspective projection.”

Midterm review: Filters

- Convolution
 - Box filters, Gaussian filters, derivatives
 - Separable filters
 - Aliasing, Gaussian pyramids, template matching
- Sample question: “What does the following 3x3 linear filter compute when applied to an image?”

0	0	0
-2	0	2
0	0	0

Midterm review: Edges and Corners

- Derivative of Gaussian, image gradients
 - Edges at different scales
 - Canny edge detector
 - Harris corner detector
- Sample question: “Why is non-maximum suppression applied in the Canny edge detector?”

Midterm review: Texture

- Texture representation
 - Laplacian pyramid, oriented pyramid
 - Texture matching
 - Texture synthesis (details of homework)
- Sample question: “Why does the top-most image in a Laplacian pyramid differ from the others?”

Midterm review: Stereo Vision

- Epipolar constraint, image rectification
 - Ordering and brightness constancy constraints
 - Normalization of image patches
 - Window size
 - Dynamic programming approach
- Sample question: “Under what conditions is the ordering constraint violated in stereo matching?”

Midterm review: Segmentation

- Gestalt properties
 - Agglomerative clustering, dendrogram
 - K-Means clustering (EM details not required)
 - Background subtraction
- Sample question: “The simplest method for background subtraction is to just subtract the pixels in one frame from the previous one. Why do many systems instead try to build a model of the background from extended image sequences?”

Midterm review: Fitting a Model

- Hough transform
 - RANSAC
 - Inliers vs. outliers, iterative fitting
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- Sample question: "Explain the factors that determine what size of bin to use in the Hough transform?"