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| 1. |  | Given the Discrete time sequence x[k], calculate the 4 point DFT of the aperiodic sequence x[k] of length N=4. | | | 10 | |
| 2. |  | An image processing quiz was conducted and the below image was given to the participants. The participants have to label the white spaces and identify how many objects are hidden in the given figure. | | | 10 | |
| 3. |  | Probe the given 3X3 image matrix as structuring element B and (2,2) as the origin. With the structuring element, shrink the given image by stripping away a layer of pixels and add a layer of pixels from both the inner and outer boundaries of regions. | | | 10 | |
| 4. |  | Perform entropy encoding technique on eaii!, in which the symbols are encoded with fewer bits than actually seen symbols.   | Symbol | Probability | Range | | --- | --- | --- | | a | 0.2 | [0.0, 0.2) | | e | 0.3 | [0.2, 0.5) | | i | 0.1 | [0.5, 0.6) | | o | 0.2 | [0.6, 0.8) | | u | 0.1 | [0.8, 0.9) | | ! | 0.1 | [0.9, 1.0) | | | | 10 | |
| 5. |  | Compress the given file into a smaller file using a table-based lookup encoding. The values already into dictionary are a=1, b=2 and c=3  T= ababcbababaaaaaaa | | | 10 | |
| 6. |  | Segment the image by clustering the pixel values applying fast scanning algorithm. Assume the threshold value to be 45   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 255 | 253 | 252 | 80 | 150 | 147 | 154 | 152 | | 248 | 84 | 85 | 81 | 88 | 158 | 156 | 151 | | 250 | 246 | 79 | 90 | 83 | 186 | 195 | 153 | | 77 | 80 | 82 | 88 | 79 | 81 | 191 | 150 | | 81 | 86 | 120 | 121 | 127 | 124 | 125 | 123 | | 35 | 85 | 126 | 118 | 233 | 240 | 247 | 230 | | | | 10 | |
| 7. |  | Perform histogram specification on the 8X8, 8-Level grey image shown below:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 0 | 4 | 4 | 4 | 0 | | 3 | 1 | 5 | 1 | 3 | | 3 | 5 | 5 | 5 | 2 | | 3 | 2 | 5 | 2 | 3 | | 4 | 6 | 6 | 7 | 7 |      |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Grey Levels(rk) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | No of Pixels(pk) | 0 | 0 | 0 | 0 | 20 | 20 | 16 | 8 | | | | 10 | |
| 8. |  | Consider the given image which shows the top view of modern house and it is surrounded by grasses. Further, consider the house as region of interest and others are background information. As you are an image processing expert represent the shape of the house using region based quad tree method. Construct the quad-tree and represent the region up to 4 levels | | | 10 | |
| 9. |  | In a given application, an averaging mask is applied to an input image A to reduce noise. Further a Laplacian mask is applied to enhance small details. The intensity values of the pixel of image A is given as, A=[2 6 8; 3 5 8; 4 3 2]. Prove that if the order of the operations were reversed, will the result be same? What practical issues would be encountered in computer implementation? | | | 10 | |
| 10. |  | Determine the intensity and color of a point on a surface using shading model. Explain how light is reflected by a polished metal and paper | | | 10 | |
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