**QUIZ-2, COMPUTER VISION** *[2.5 marks, 30 mins]*

Q1) How many pixels will lie completely inside a blob of radius 3? What must have been the σ of the LoG filter that detected this blob? [0.5 marks]

Q2) In your data, you have two channels, as shown below:

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 |
| 3 | 14 | 15 | 16 |

| | | | |
|---|---|---|---|
| 16 | 15 | 14 | 13 |
| 12 | 11 | 10 | 9 |
| 8 | 7 | 6 | 5 |
| 4 | 3 | 2 | 1 |

Apply SPP with spatial partitions of 1, 4 and 16 to generate a feature vector for this data. For summarizing a spatial partition, use maximum. [0.75 marks]

Q3) Using a dataset, let's say you have extracted three key patch features in your BoW model, as given below.

| | | | | |
|---|---|---|---|---|
| KP1 | 16 | 15 | 14 | 13 |
| KP2 | 12 | 11 | 10 | 9 |
| KP3 | 4 | 3 | 2 | 1 |

Your image has following patch features:

| | | | | |
|---|---|---|---|---|
| P1 | 16 | 1 | 14 | 1 |
| P2 | 12 | 17 | 10 | 8 |
| P3 | 18 | 0 | 6 | 5 |
| P4 | 1 | 3 | 2 | 1 |
| P5 | 13 | 34 | 23 | 1 |
| P6 | 22 | 1 | 7 | 5 |
| P7 | 33 | 12 | 1 | 1 |

What will be the BoW feature for such an image? Use Manhattan distance. [0.75 marks]

Q4) An eigen value and the trace of the co-variance matrix M are 2 and 6, respectively. Find the ranking scores of this potential key-point as per Harris and Shi-Thomsi. Take 'k' constant as 0.05. [0.5 marks]