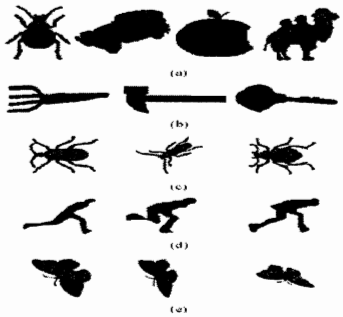
Multimedia Systems

Major (2008)

F.M =35 Time: 2 hr

1. Consider a 4-symbol alphabet A={a,b,c,d} with fixed symbol probabilities p(a)=0.3, p(b)=0.2, p(c)=0.4, p(d)=0.1. We need to code the sequence "cacbad". Compute the encoding following (i)Huffman coding and (ii) arithmetic coding. Compare the degree of compression. (6)

2. I need to design a shape based image retrieval system which is expected to have shapes shown in the figure in its collection. Provide the complete system design. (6)



3. Consider the following code:

```
for (x=0; x<IM_SIZE; x++)
   for (y=0; y<IM_SIZE; y++)
      for (i=0;i<MSK_SIZE;i++)
         for (j=0;j<MSK_SIZE;j++)
            out[x][y]+=in[x+i][y+j]*mask[i][j];
```

Assume a VLIW architecture which can perform an arithmetic operation or multiply, together with two parallel memory loads and two address calculations in parallel. For this architecture design an optimal schedule of instructions for the given code and indicate relative advantage of your schedule (6)

4. We need to design an interactive TV service with following features: (i) Combine data from multiple sources on user demand, (ii) can switch to video-on-demand on user request and (iii) provide facility to the user for implementing tele-marketing applications. Provide detailed design of server and client architecture and the protocol for communication and control. (6)

5. Answer following questions briefly:

(i) Why accumulators in a DSP are provided with guard-bits? (2)
(ii) How can you use vector graphics for efficient picture delivery? (2)
(iii) Suggest a loss-less coding scheme for gray level images. (3)
(iv) How does RSVP perform admission control for real-time data delivery? (2)
(v) Design a scheme for speech based communication scheme which requires just the bandwidth for transmission of ascii text. (2)