1. Fill in the blanks (20 points, 1 points/each blank)

1) (A,D, H,E; B, C; 15)

2) (completeness, optimality)

3) (1.99;1.9504)

4) (evaluation function; alpha-beta pruning)

5) (larger; less)

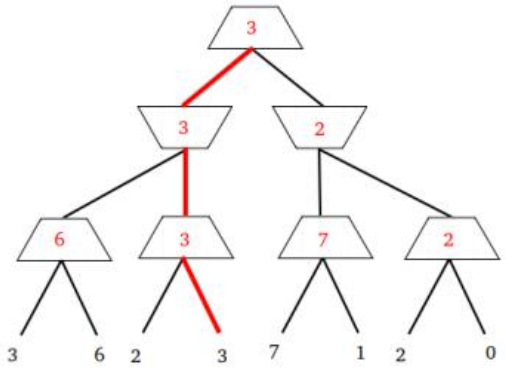
6) (sum of square error, SSE; regularization)

7) (validation set, test set)

8) ([class] conditional; posterior [class])

9) (input, forget)

10)



2. Single Choice (50 points, only one of the options is correct. 2 points/ one question)

DAACD DBCAB

BCACA ACDDB

ABBCC

3. Calculus and Analysis (30 points)

1） (Answer: -0.2, 0.4, -0.4, -0.6)

2)

(a) **(Answer: 0, 2, -1)**

(b) **(Answer: -2)**

(c) **(Answer: 3*3, 7*7)**

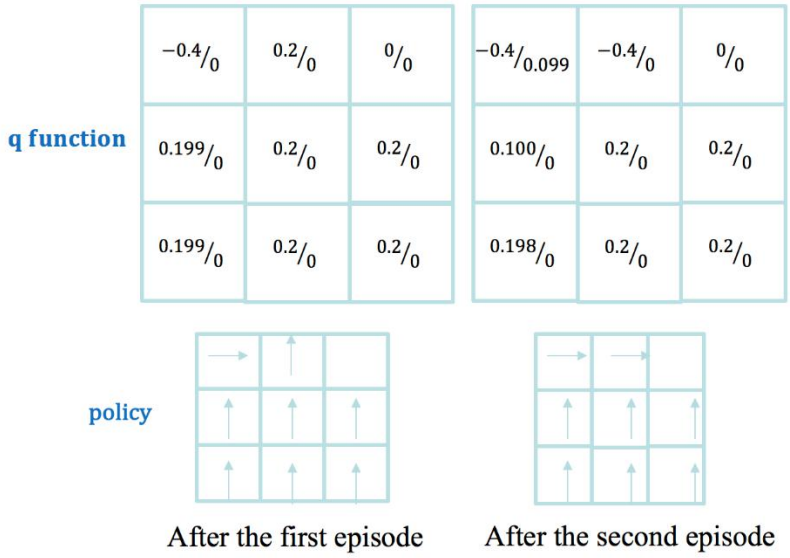
(d) **(Answer: 6, 8,**

3, 4)

3)Answer：

(a) S_1; (b) S_d, S_9

(c) (d)



4)

Answer:

a. Summary: Eigenfaces is the name given to a set of eigenvectors when they are used in the computer vision problem of human face recognition. Eigenface method is a principal component analysis method for face image dimensionality reduction. The original face image is represented by a linear combination of eigenvectors which are called ‘eigenface’.

b. Advantages: Its training process is completely automatic and easy to code. Eigenface adequately reduces statistical complexity in face image representation. Once eigenfaces of a database are calculated, face recognition can be achieved in real time. Eigenface can handle large databases.

Disadvantges: It is very sensitive to lighting, scale and translation, and requires a highly controlled environment. Eigenface has difficulty capturing expression changes. The most significant eigenfaces are mainly about illumination encoding and do not provide useful information regarding the actual face.