《Artificial Intelligence》
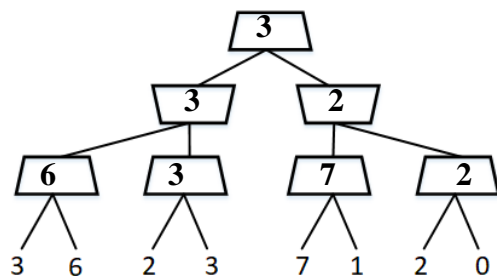
Final Examination Answer Sheet

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Section	1	2	3	Total
Score				
Reviewer				

1. Fill in the blanks (20 points, 1pt/per)

1). _____ A, E _____, _____ S, C,F,G _____, _____ 7 _____

2). _____ Completeness _____, _____ Optimality _____

3). _____ 1.99 _____ , _____ 1.9504 _____

4). _____ Evaluation functions _____, __ Alpha-Beta _____

5). _____ greater _____ , _____ less _____

6). _____ estimated y(xn, w) _, _____ MAP _____

7). _____ Test Set _____, _____ Validation Set _____

8). ____ joint _____ , _____ conditional _____

9). _____ input _____ , _____ forget _____

10).

Player 1	Left
Player 2	Right Right
Player 1	Right Right Left Left

2. **Multiple Choice (50 points, 2pt/per)**

1	2	3	4	5	6	7	8	9	10
A	D	A	B	A	D	C	C	A	B
11	12	13	14	15	16	17	18	19	20
B	C	A	C	B	A	C	D	D	B
21	22	23	24	25					
A	B	B	C	A					

-propagat **3. Calculus and Analysis (30 points)**

1) (Neural Network, 8 points)

(a) $\partial f / \partial w_0$ =_____-0.20_____   (b) $\partial f / \partial x_0$ =__0.40_____   (c) $\partial f / \partial w_1$ =___-0.40_____

(d) $\partial f / \partial x_1$ =___-0.60_____

2) (Deep Learning, 8 points)
  (a) (2 points)

    0 2 -1

  (b) (2 points)

    -2

  (c) (2 points)

    a: 3*3
    b: 7*7

  (d) (2 points)

    6 8
    3 4

3) (Reinforcement Learning, 8 points)

(a) (2 points)

$0.2/0$	$0.2/0$	$0/0$
$0.2/0$	$0.2/0$	$0.2/0$
$0.2/0$	$0.2/0$	$0.2/0$

policy

↑	↑	
↑	↑	↑
↑	↑	↑

(b) (2 points)

$0.2/0$	$0.2/0$	$0/0$
$0.2/0$	$0.2/0$	$0.2/0$
$0.2/0$	$0.2/0$	$0.2/0$

(c) (2 points)

$-0.4/0$	$0.2/0$	$0/0$
$0.199/0$	$0.2/0$	$0.2/0$
$0.199/0$	$0.2/0$	$0.2/0$

→	↑	
↑	↑	↑
↑	↑	↑

(d) (2 points)

$-0.4/0.099$	$-0.4/0$	$0/0$
$0.100/0$	$0.2/0$	$0.2/0$
$0.198/0$	$0.2/0$	$0.2/0$

→	←	
↑	↑	↑
↑	↑	↑
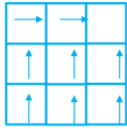
4) (PCA, 6 points)
(a) (3 points)

An eigenface is the name given to a set of eigenvectors when used in the computer vision problem of human face recognition. The eigenvectors are derived from the covariance matrix of the probability distribution over the high-dimensional vector space of face images. The eigenfaces themselves form a basis set of all images used to construct the covariance matrix. This produces dimension reduction by allowing the smaller set of basis images to represent the original training images. Classification can be achieved by comparing how faces are represented by the basis set.

(b) (3 points)

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.

Disadvantages:

- 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.