

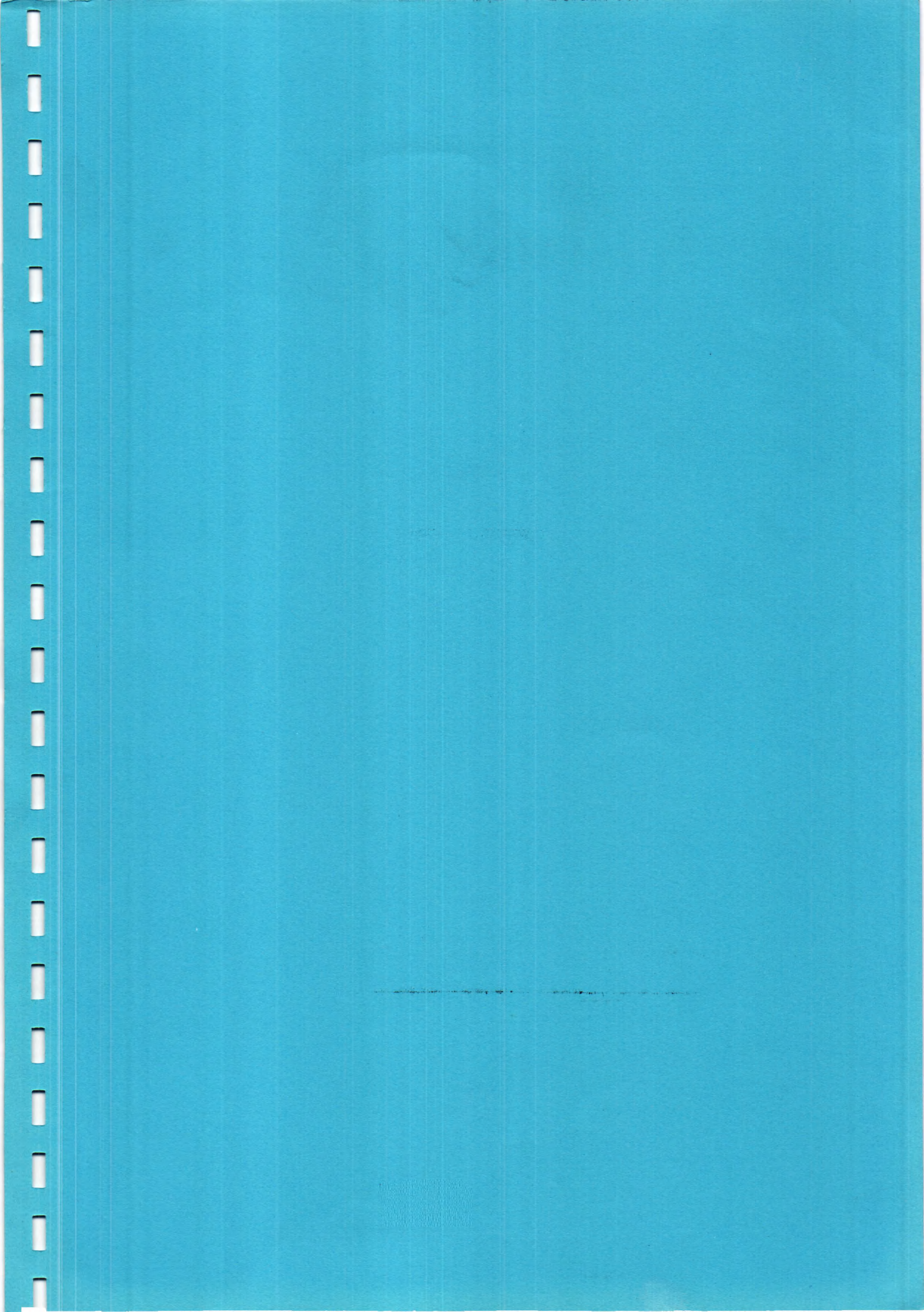
KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

Level : B. Sc.
Year : IV

Marks scored:

Course : COMP 484

Semester: I *2 II (CS)*



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Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date **AUG 27 2018**

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. The process of forming general concept definitions from examples of concepts to be learned:
a. Deduction b. Abduction c. Induction d. Conjunction
2. Computers are best at learning:
a. Facts b. Concepts c. Procedure d. Principles
3. Another name for an output attribute:
a. Independent variable b. Dependent variable
c. Constant d. None of the above
4. Which statement is true about neural network and linear regression models?
a. Both models require input attributes to be numeric
b. Both models require numeric attributes to range between 0 and 1
c. The output of both models is a categorical attribute value
d. Both techniques build models whose output is determined by a linear sum of weighted input attribute values
5. Which of the following is a common use of unsupervised clustering?
a. Detect outliers
b. Determine a best set of input attributes for supervised learning
c. Evaluate the likely performance of a supervised learner model
d. Determine if meaningful relationships can be found in a dataset
6. Selecting data so as to assure that each class is properly represented in both the training and the test set.
a. Cross validation b. Stratification c. Verification d. Bootstrapping
7. The standard error is defined as the square root of this computation:
a. The sample variance divided by the total number of sample instances
b. The population variance divided by the total number of sample instances
c. The sample variance divided by the sample mean
d. The population variance divided by the sample mean

8. Machine Learning techniques differ from statistical techniques in that machine learning methods
 - a. Typically assume an underlying distribution for data
 - b. Are better able to deal with missing and noisy data
 - c. Are not able to explain their behavior
 - d. Have trouble with large-sized datasets

9. This supervised learning technique can process both numeric and categorical input attributes

a. Linear regression	b. Bayes classifier
c. Logistic regression	d. Backpropagation learning

10. This technique associates a conditional probability value with each data instance.

a. Linear regression	b. Logistic regression
c. Simple regression	d. Multiple linear regression

11. Data used to optimize the parameter settings of a supervised learner model

a. Training	b. Testing	c. Verification	d. Validation
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12. Bootstrapping allows you to
 - a. Choose the same training instances several times
 - b. Choose the same test set instance several times
 - c. Build models with alternative subsets of the training data several times
 - d. Test a model with alternative subsets of the test data several times

13. Logistic regression is a _____ regression technique that is used to model data having a _____ outcome.

a. Linear, numeric	b. Linear, binary
c. Nonlinear, numeric	d. Nonlinear, binary

14. The correlation between the number of years an employee has worked for a company and the salary of the employee is 0.75. What can be said about employee salary and years worked?
 - a. There is no relationship between salary and years worked
 - b. Individuals that have worked for the company the longest have higher salaries
 - c. The majority of the employees have been with the company for a long time
 - d. The majority of the employees have been with the company for a short time

15. The correlation coefficient for two real-valued attributes is -0.85. What does this tell you?
 - a. The attributes are not linearly related
 - b. As the value of one attribute increases the value of the second attribute also increases
 - c. As the value of one attribute decreases the value of the second attribute increases
 - d. The attributes show a curvilinear relationship

16. Regarding bias and variance, which of the following statement is true? (“Here ‘high’ and ‘low’ are relative to the ideal model.)
 - a. Models which overfit have a high bias
 - b. Models which overfit have a low bias
 - c. Models which underfit have a high variance
 - d. None of the above

AUG 27 2018

17. Suppose your model is overfitting. Which of the following is NOT a valid way to try and reduce the overfitting?
- a. Increase the amount of training data
 - b. Improve the optimization algorithm being used for error minimization
 - c. Decrease the model complexity
 - d. Reduce the noise in the training data
18. Averaging the output of multiple decision tree helps _____
- a. Increase bias
 - b. Increase variance
 - c. Decrease bias
 - d. Decrease variance
19. Entropy values range from :
- a. 0 to 1
 - b. centroid
 - c. signature
 - d. prototype
20. Higher value of entropy would mean which of the following:
- a. Attributes of instances belong to mixed class of values
 - b. Attributes of instances belong to just one class of values
 - c. Attributes of instances cannot be related to any class of values
 - d. None of the above



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SECTION "B"

[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Define the terms - Concept Learning, Instances, Target concept and Hypotheses.
2. How does a decision tree learning algorithm work? What is the basis for selection of the nodes of the decision tree?
3. Define a perceptron. Provide a mathematical and diagrammatic representation of a perceptron.
4. Shed light on the two key difficulties when we must learn a hypothesis and estimate its future accuracy given only a limited set of data – i) Bias in the estimate and ii) Variance in the estimate.
5. How are Bayesian Learning methods relevant to the study of machine learning? Briefly discuss two reasons.
6. Differentiate between genetic algorithms and genetic programming.
7. What is reinforcement learning? What are some of its application areas?

SECTION "C"

[2 Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. Discuss the k-Nearest Neighbor learning as instance-based learning method. How is the curse of dimensionality or the presence of many irrelevant attributes possibly handled in the k-Nearest Neighbor learning? [4+4]
9. Differentiate between "training error" and "true error". Define PAC learning in terms of "training error" and "true error". [4+4]
10. Discuss the Backpropagation algorithm. What are its concrete advantages over single perceptrons? Also point its drawbacks. [4+ 2+2]

