COMPSCI 589 Fall 2023 Midterm

[This is a Sample]

Note:

* The midterm has 50 True/False statements. Your answer should be either **True** or **False**. Any other answers will be considered INVALID. No explanation is needed and will not be taken into consideration for grading. Failing to write the answers clearly will result in loss of points.
* Each statement is weighted equally for 2 points. The total mark is 100. A correct answer gives you 2 points. Otherwise, you get 0 points.
* Please put down your True/False answer in the **solution sheet**, one row per five statements. **We will only grade the answers in the solution sheet.** Answers next to the questions but not in the solution sheet will not be considered. Online students who do not have the solution sheet should organize your answers using a similar format on a clean white paper: *clearly write numbers to indicate to which answers correspond*.
* Remember to put down your First Name, Last Name, Campus ID, and UMass email address in the solution sheet. Failing to do so will cause issues in matching your solution sheet with your Gradescope account.
* You have a total of **75 min** to finish the midterm unless you are pre-approved by the Instructor for extra exam time.

| No. | Statement |
| --- | --- |
| 1 | Zero-order optimization can only find local minima, not global minima. |
| 2 | Zero-order optimization techniques require the calculation of derivatives of the function being optimized. |
| 3 | Linear regression can be used to fit a hyperplane in higher dimensions, not just a line in two dimensions. |
| 4 | The Least Squares cost function in linear regression is non-convex regardless of the dataset. |
| 5 | Linear classifiers are best suited for problems where the classes can be separated by a linear boundary. For complex, nonlinear relationships, nonlinear classifiers or kernel methods are typically used. |
| 6 | Logistic regression, despite its name, is a linear classification method. |
| 7 | Principal Component Analysis (PCA) is a supervised learning technique. |
| 8 | Principal components of PCA are orthogonal to each other. |
| 9 | K-means can effectively cluster data with complex shapes and non-linear cluster boundaries. |
| 10 | Feature selection can reduce overfitting by eliminating redundant or irrelevant features. |

## 

## 

## Solution Sheet

| First Name | <put in your first name> |
| --- | --- |
| Last Name | <put in your last name> |
| Campus ID | <put in your campus ID> |
| Email | <put in your umass.edu account> |

| No. | Answer | No. | Answer | No. | Answer | No. | Answer | No. | Answer |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
| 6 |  | 7 |  | 8 |  | 9 |  | 10 |  |

## 

## Solution Sheet with sample answers

| First Name | Hui |
| --- | --- |
| Last Name | Guan |
| Campus ID | 12334567 |
| Email | [huiguan@umass.edu](mailto:huiguan@umass.edu) |

| No. | Answer | No. | Answer | No. | Answer | No. | Answer | No. | Answer |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | False | 2 | False | 3 | True | 4 | False | 5 | True |
| 6 | True | 7 | False | 8 | True | 9 | False | 10 | True |

## 

## 