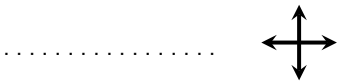
Exam Data Science II Final

Neighbours

Lecturer: Daniel T. McGuiness, Ph.D

SEMESTER: WS 2024
DATE: 16.12.2024
TIME: 13:00 - 14:30



First and Last Name

.....

Student Registration Number

.....

Grading Scheme	$\geq 90\%$	1
	$\leq 80\%$ and $\geq 90\%$	2
	$\leq 70\%$ and $\geq 80\%$	3
	$\leq 60\%$ and $\geq 70\%$	4
	$\leq 60\%$	5

Result:

___/ max. 100 points

Grade:

Student Cohort BA-MECH-22

Study Programme B.Sc Mechatronics, Design and Innovation

Permitted Tools Nothing is allowed.

Important Notes

Unnecessary Items

Place all items not relevant to the test (including mobile phones, smartwatches, etc.) out of your reach.

Identification (ID)

Lay your student ID or an official ID visibly on the table in front of you.

Examination Sheets

Use only the provided examination sheets and label each sheet with your name and your student registration number. The sheets be labelled on the front. Do not tear up the examination sheets.

Writing materials

Do not use a pencil or red pen and write legibly.

Good Luck!

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Please read the following instructions carefully.

- You have **90 minutes** to complete this exam. This question booklet contains 1 question(s), 2 pages (including the cover) for the total of 100 points.
- Check to see if any pages are missing.
- All the questions are **compulsory** and all the notations used in the questions have their usual meaning taught at the lectures and done in practice.
- **Read the instructions for individual questions carefully** before answering the questions.

Question	Maximum Point	Received Point
On the Topic of Machine Learning	100	
Sum	100	

[Q1] On the Topic of Machine Learning — 100

a. What type of algorithm would you use to segment your customers into multiple groups ? Please justify your reasoning. (20)

b. What are the main applications of clustering algorithms? Please give examples of where clustering algorithms would be the preferred options over other machine learning algorithms. (20)

c. What is the fundamental idea behind support vector machines and what is a support vector? Please explain both these questions with sufficient detail and draw diagrams or write equations if necessary. (20)

d. What is precision and recall ? Is it possible to have a system which has both perfect precision and recall? Please give an example of a perfect recall and a perfect precision. (20)

e. When a dataset dimension has been reduced from n to $n-1$ is it possible to go back (i.e., has information been lost) ? If so, why? If not why? (20)