Diploma Programme
Programme du diplôme
Programa del Diploma

Computer science
Higher level
Paper 3

8 May 2023

Zone A morning | **Zone B** afternoon | **Zone C** morning

1 hour

Instructions to candidates

- Do not turn over this examination paper until instructed to do so.
- A clean copy of the **computer science case study** is required for this examination paper.
- Read the case study carefully.
- Answer all questions.
- The maximum mark for this examination paper is **[30 marks]**.

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2 pages

1. (a) State **two** cloud deployment models (line 20). [2]

(b) Identify **two** differences between platform as a service (PaaS) and software as a service (SaaS). [2]

2. (a) *NextStar* will gather and store users' explicit and implicit behavioural data and then use this data to personalize adverts. Data protection guidelines state that users have a right to privacy.

Explain how *NextStar* could ensure users' right to privacy is upheld. [4]

(b) One problem with supervised learning is overfitting.

Outline **two** strategies to reduce the risk of overfitting. [4]

3. In response to an advert for an upcoming television series, 20 users of *NextStar* uploaded acting video clips. The following evaluation was carried out:

- The recommender system rated all 20 clips on a scale of 1–5.
- Those scoring 4 or 5 were recommended.
- Those scoring 1, 2, or 3 were **not** recommended.
- Five users scored 4 or 5 so were recommended.
- Fifteen users scored 1, 2, or 3 and were **not** recommended.
- All 20 clips were then viewed and rated manually by recruiters from the television series.
- Four of the 20 users were given roles in the television series.
- Three of the four users who were given roles were from the five that were recommended.
- One of the four users who were given roles was not from the five that were recommended.

The F-measure is used to evaluate recommender systems.

Explain how the F-measure might be applied in this scenario. [6]

4. "Recommender systems can use content-based filtering, collaborative filtering, or a combination of both. Hybrid recommender systems combine several machine learning algorithms" (lines 43–44).

Discuss the advantages **and** disadvantages of these different approaches for building a recommendation system. [12]