Diploma Programme
Programme du diplôme
Programa del Diploma

Computer science
Higher level
Paper 3

Monday 7 November 2016 (afternoon)

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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Answer **all** questions.

1. (a) Identify **two** factors that determine the colour assigned to a point on an object, when a 3D scene is rendered. [2]

(b) With the use of examples, define the term *primitives* as used in 3D modelling. [2]

2. (a) With the use of an example, describe the relationship between *avars* and *motion capture* (Mo-cap). [4]

(b) An animator wishes to move the hand of a cartoon character so that it touches a wall. He wants the movement to be as realistic as possible.

Explain how *inverse kinematics* can help the animator to achieve this transformation. [4]

3. *Ray-tracing* techniques involve following the path taken by rays between a light source and a viewpoint (viewer's eye or camera). This could theoretically be traced in either direction.

By making use of a diagram, explain from a computational point of view, why only one of these directions is normally considered. [6]

4. Xiao-Ling and her team are planning to produce a commercial using computer animation. The commercial will last for three minutes and will involve the following features:

- the use of three anthropomorphic creatures
- movement through a changing mountainous terrain
- a high degree of *photorealism*.

By analysing the relevant algorithms and processes referred to in the case study, discuss how the demands being placed on computer resources might affect decisions taken by the team in order to achieve the features listed above. [12]