Date: Some day in June
Time: Likely morning
Duration: 1 hour
Place: MSAC (huh?)
Number of Pages: 2

Instructions to Candidates
This examination accounts for 30% of the total marks for the subject.
This examination totals 30 marks.
Answer all questions: 1 to 3.
Marks for each question are shown.
This examination is closed book.
Calculators are not permitted.

Notes:
Previous exams (available on course website) were 2 hours long and worth 50%. This year’s exam is 1 hour (plus 15 minutes reading time) and worth 30%.
The questions in previous exams on clipping and rasterization algorithms relate to material which used to be covered in lectures, but has been replaced this year with new material (textures, interaction, sound).

Question 1
Note: some of these questions relate to material specifically covered in a given year.
Give a concise answer to each of the following questions:

(a) Draw triangles which allow the values of \( \cos(60^\circ) \), \( \sin(60^\circ) \) and \( \cos(45^\circ) \) to be determined.
(b) Normalise the vector \((1, -2, 1)\).
(c) What does fps mean?
(d) What is the difference between the hidden surface problem and visible surface determination?
(e) What C data types are supported as arguments to \texttt{glVertex}?
(f) What 3D points do the homogeneous coordinates \((3,2,-6,2)\) and \((6,4,-12,2)\) represent?
(g) What mathematical property ensures that (i) the matrix products \(ABCD\), \((AB)(CD)\) and \(A(BC)D\) are the same and (ii) \(ABCD\) and \(DCBA\) are different?
(h) Give an example of an \textit{image space} and an \textit{object space} approach to the hidden surface problem.
(i) What is \textit{machinima}?
(j) What type of view volume does (i) a \textit{parallel} and (ii) a \textit{perspective} projection give?

\[\frac{1}{2}\text{ mark each } = 5 \text{ marks}\]
Question 2

Given the two vectors:
\[ \vec{A} = 2i - 3j + k \]
\[ \vec{B} = i + 2j - k \]

Calculate or perform each of the following, showing your working:

(a) the cosine of the angle between \( \vec{A} \) and \( \vec{B} \)
(b) \( \vec{A} \times \vec{B} \)
(c) The plane equation of the plane defined by \( \vec{A} \) as the normal and the point (2, 3, −1).

(2+3 = 5 marks)

Question 3

Questions based on topics from assignments, tutorials and lectures, for example:

- Modelling and model formats
- OpenGL drawing primitives
- OpenGL lighting and shading

Topics not on test/exam

- Interaction
- Animation
- Texturing
- Sound
- Performance

(4+4+4+4+4= 20 marks)

THE END