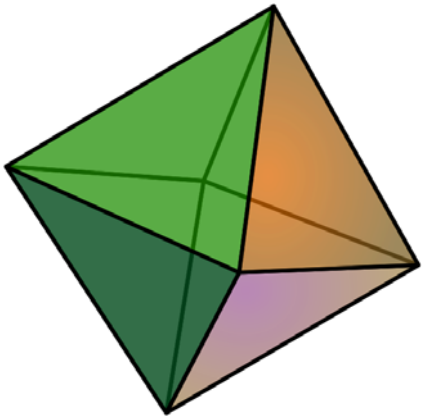
Computer Science

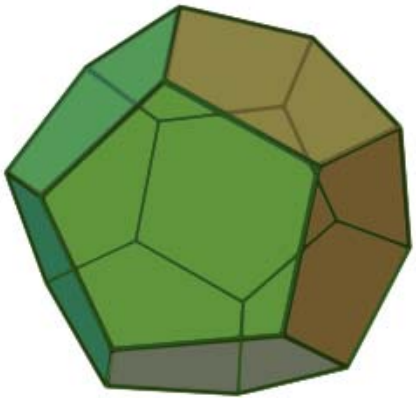
COMPSCI 372 S2 C – Exercise Sheet 1
Sample Solution

Q1: Go to YouTube (http://www.youtube.com/) and find three EXCITING (!) movies explaining applications or cool tools related to Computer Graphics ☺

Solution:
1) A summary of the SIGGRAPH Computer Animation festival:
http://uk.youtube.com/watch?v=feBKaTJD-TA&feature=related
2) Fantasy plants: http://uk.youtube.com/watch?v=JUdpFN4O4B0&feature=related
3) The making of "The Matrix – rooftop scene":
http://www.youtube.com/watch?v=GSRqH9S2dwM&feature=related
4) Famous ad for an Australian beer brand using NZ crowd animation software (see assignment 1 ;-))
http://www.youtube.com/watch?v=Mv5U0W8FDDk
5) Very creative animation presented at the SIGGRAPH 2005 Animation Festival:
http://uk.youtube.com/watch?v=08HkQ8TkKbs

Q2: Show that Euler's formula is valid for an Octahedron (left) and a Dodecahedron (right).



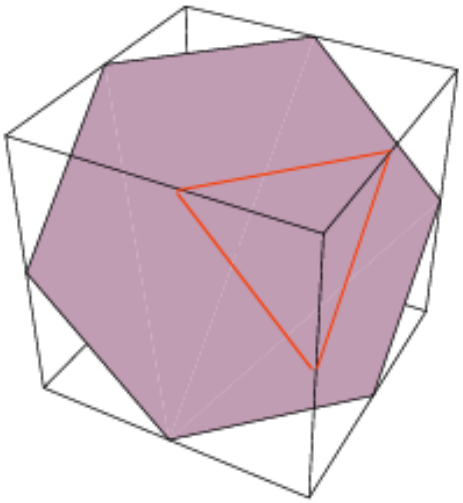


Solution:
Octahedron: $F = 8, E = 12\ V = 6$ => F-E+V=2 ✓
Dodecahedron: $F = 12, E = 30\ V = 20$ => F-E+V=2 ✓

Q3: This question is testing your spatial vision. Please answer it just by thinking about it, i.e. don't use paper, or a computer or physical model.

(a) Imagine you have a cube and rotate it such that one of its diagonals is perpendicular to the xy-plane. Now you move the xy-plane upwards such that it intersects the cube first at the bottom corner and finally at the to corner.
What are the shapes of the intersections of the rotated cube and the plane while you move the plane upwards?

Solution:
The resulting interaction is the same as if you use a cube aligned with the coordinate system and a plane with a normal pointing from the bottom-left-back corner to the top-right-front corner.
The image on the right illustrates that initially the intersection is an equilateral triangle and then a hexagon before it becomes a again a triangle.



(b) What types of shapes can you create by intersecting a cone with a plane?

Solution:
The illustration below shows that depending on the orientation of the plane with respect to the cone the intersection is a circle, an ellipse, a parabola or a hyperbola.