CITS2401 Computer Analysis and Visualization 2017 Semester 1
Assignment 1

This assignment is to be completed in Cody Coursework (https://coursework.mathworks.com/). If you are not already enrolled in the Cody Coursework for CITS2401, let us know so we can re-send the invitation to you.

Cody gives you instant feedback on your solution which is a great way of learning.

You are allowed unlimited attempts to solve the questions BEFORE the deadline. You can check your solution each time. Only your last solution before the deadline will be marked. Submissions after the deadline will not be accepted unless you have a special consideration for late submission or you have not attempted the questions at all before the deadline. In the latter case, late submission penalty will apply.

Question 1:   **(10 marks)**

Fibonacci numbers are a sequence where the next number is the sum of the previous two numbers. Write a function that calculates the nth Fibonacci number.

Fibonacci numbers: 1 1 2 3 5 8 ....

Given n, return f where f = fib(n) and f(1) = 1, f(2) = 1, f(3) = 2, ...

Examples:

    Input n = 5
    Output f is 5
    Input n = 7
    Output f is 13

Question 2:   **(20 marks)**

Write a function that will compute and return all the prime numbers up to N. One way to solve this is using a simple loop and a conditional statement. However, any other correct solution is acceptable.
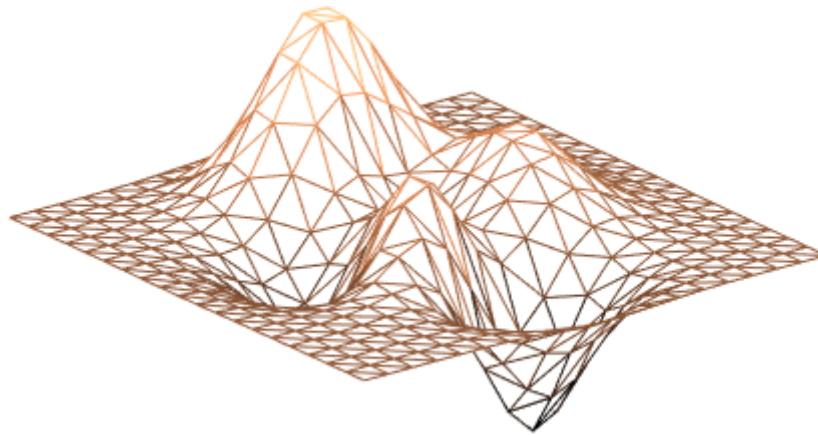
Examples;

    Input   N = 10;   Output   P = [2, 3, 5, 7]
    Input N = 3;   Output   P = [2, 3]

Question 3:   **(20 marks)**

A complex 3D surface can be represented by a triangular mesh which is a collection of planar 3D triangles as shown in the figure below.

Write a function that finds the area of any 3D surface represented by as set of 3D points P (a Nx3 matrix) and triangles T (a Mx3 matrix) that contains the three vertices of the triangles (as row indices of the matrix P). The surface area is essentially the sum of all the triangle areas. Note that the triangles are in 3D.

Find the equation for the area of a triangle from this webpage
http://mathworld.wolfram.com/TriangleArea.html.

Example: Three sides of a cube.

Input P = [0 0 0; 1 0 0; 1 1 0; 0 1 0; 0 1 1; 0 0 1; 1 0 1];
    T = [1 2 3; 1 3 4; 1 4 5; 1 5 6; 1 6 7; 1 2 7];
Output
area = 3