Computer Lab 3 – Week 4

Part 1

Create a 2D numerical array using matrix = magic(5); Double click on this variable in the

"Workspace" window and view the matrix in real time. You can dynamically adjust the columns widths and vertical window space. If you've lost your command window, you can also undock the Workspace Browser (or window titled "Variables").

Practice changing the values in the matrix either via the command window using commands such as

matrix(3,3) = 1000, or by double-clicking on the Workspace Browser and entering a new value. To double check that the matrix has been updated, use disp(matrix). Use MATLAB Help browser to find out how to create an identity matrix of size 5 x 5.

Part 2

Cell arrays can be used instead of numerical arrays when wanting to use data that is not solely comprised of numbers. We are going to use cell arrays to create a weekly timetable. First, let's declare a blank timetable.

timetable = {'','Monday','Tuesday','Wednesday','Thursday','Friday','Saturday','Sunday';

'8:30-9:30','','','','','','';

'9:30-10:30','','','','','','';

'10:30-11:30','','','','','','';

'11:30-12:30','','','','','','';

'12:30-1:30','','','','','','';

'1:30-2:30','','','','','','';

'2:30-3:30','','','','','','';

'3:30-4:30','','','','','','';

'4:30-5:30','','','','','','';

'5:30-6:30','','','','','','';

'6:30-7:30','','','','','','';

'7:30-8:30','','','','','','';

'8:30-9:30','','','','','','';

'9:30-10:30','','','','','','',};

Now, you can enter individual items such as timetable{7,2} = 'ENGG100 Lecture';

Your task in this part of the assignment is to construct your weekly timetable showing clearly where you will spend your TWELVE hours on ENGG100. This must include contact classes (Lect/Prac/WS), but also self-study time. Also include constraints (eg. other subjects, part-time job, sports, family commitments, etc). The timetable must be constructed programmatically. Show your tutor the program you have written.

Part 3

When encountering an error in MATLAB, it is important to read the information carefully given by MATLAB to solve the problem. For example, if we run the following piece of code, MATLAB will throw an error.

```
a = [1 2 3];
b = [1 2];
c = a+b;
```

Error using +

Matrix dimensions must agree.

Now let's look at the code. The first two lines define two vectors, one is of 3 elements and the other is of 2. The error occurs because we cannot add two vectors of different dimensions.

Run the code below where we want to concatenate d with itself and create a 1x6 array in g with the sines of the concatenated vector. Explain why the error occurs and how to solve it.

```
d=[0,pi/4,pi/2];
g = sin(d, d);
```

Once corrected, the answer should be:

```
    0    0.7071    1.0000         0    0.7071    1.0000
```

For you to do:

Write a Matlab code that asks the user for the coordinates of 2 points, then returns the distance between the points in a 3 dimensional space. Ensure that the code is well commented and that any prompts shown in the interface are user-friendly.

Hint: Use arrays to store the 3d coordinates of the points