Name: Key

EE432 Fall 2008 Quiz 03

1. Given a vector of data x, where the values fall between -11 and +17, what MATLAB commands would you use to change the data to a new variable, y, with values that fall in the range from -1 to 1?

$$y = \frac{x - x_{min}}{x_{max} - x_{min}} = \frac{x - (-11)}{28}$$

```
>> y = (x + 11)/28;
```

2. What MATLAB commands would you use to create a uniformly distributed set of random numbers that fall in the range -5 to 6?

$$y = x * \underbrace{(6 - -5)}_{x_{max} - x_{min}} + x_{min} = 11x - 5$$

```
>> y = 11 * x - 5
```

Given the following MATLAB commands, will there be an error? If so, why? If not, what is the answer?

```
>> x = [1 2 3];, z = [1;2;3;4];,
```

3. `>> y = x * x`

error $(1 \times 3) * (1 \times 3)$ dimension mismatch

4. `>> z = x .* z`

error $(1 \times 3) .* (4 \times 1)$ vectors have different # ele.

5. `>> w = 2.^z` $= \begin{bmatrix} 2^1 \\ 2^2 \\ 2^3 \\ 2^4 \end{bmatrix} = \begin{bmatrix} 2 \\ 4 \\ 8 \\ 16 \end{bmatrix}$

6. `>> a = x * x'`

$$\begin{bmatrix} 1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} = 1 \cdot 1 + 2 \cdot 2 + 3 \cdot 3 = \boxed{14}$$

7. The following is a portion of a text file called data.txt. Can you use the load command in MATLAB to bring the following text file into MATLAB as a variable? If not, why not? If you can, how do you use the load command and what is the name of the resulting variable?

#YY	MM	DD	hh	mm	WDIR	WSPD	GST	WVHT	DPD	APD	MWD	PRES	ATMP	WTMP	DEWP	VIS	PTDY	TIDE
#yr	mo	dy	hr	mn	degT	m/s	m/s	m	sec	sec	degT	hPa	degC	degC	degC	mi	hPa	ft
2008	08	03	19	06	310	5.1	MM	MM	MM	MM	MM	1018.2	4.4	MM	MM	MM	MM	MM
2008	08	03	19	00	320	5.1	MM	MM	MM	MM	MM	1018.3	4.5	MM	MM	MM	+0.5	MM
2008	08	03	18	54	330	4.1	MM	MM	MM	MM	MM	1018.3	4.7	MM	MM	MM	MM	MM
2008	08	03	18	48	320	4.6	MM	MM	MM	MM	MM	1018.3	4.5	MM	MM	MM	MM	MM
2008	08	03	18	42	310	6.2	MM	MM	MM	MM	MM	1018.3	4.8	MM	MM	MM	MM	MM
2008	08	03	18	36	280	3.6	MM	MM	MM	MM	MM	1018.2	4.5	MM	MM	MM	MM	MM
2008	08	03	18	30	260	3.1	MM	MM	MM	MM	MM	1018.2	4.6	MM	MM	MM	MM	MM
2008	08	03	18	24	270	3.6	MM	MM	MM	MM	MM	1018.3	4.3	MM	MM	MM	MM	MM
2008	08	03	18	18	270	3.6	MM	MM	MM	MM	MM	1018.3	4.2	MM	MM	MM	MM	MM
2008	08	03	18	12	280	4.1	MM	MM	MM	MM	MM	1018.3	4.3	MM	MM	MM	MM	MM
2008	08	03	18	06	280	6.2	MM	MM	MM	MM	MM	1018.3	4.4	MM	MM	MM	MM	MM
2008	08	03	18	00	280	6.7	MM	MM	MM	MM	MM	1018.3	4.6	MM	MM	MM	+0.6	MM
2008	08	03	17	54	270	5.7	MM	MM	MM	MM	MM	1018.4	4.6	MM	MM	MM	MM	MM
2008	08	03	17	48	260	4.1	MM	MM	MM	MM	MM	1018.3	4.6	MM	MM	MM	MM	MM
2008	08	03	17	42	270	4.6	MM	MM	MM	MM	MM	1018.3	4.4	MM	MM	MM	MM	MM
2008	08	03	17	36	280	5.7	MM	MM	MM	MM	MM	1018.2	4.6	MM	MM	MM	MM	MM
2008	08	03	17	30	270	5.7	MM	MM	MM	MM	MM	1018.2	4.6	MM	MM	MM	MM	MM
2008	08	03	17	24	280	3.6	MM	MM	MM	MM	MM	1018.2	4.6	MM	MM	MM	MM	MM
2008	08	03	17	18	260	6.7	MM	MM	MM	MM	MM	1018.3	4.6	MM	MM	MM	MM	MM
2008	08	03	17	12	270	5.7	MM	MM	MM	MM	MM	1018.2	4.6	MM	MM	MM	MM	MM
2008	08	03	17	06	280	5.7	MM	MM	MM	MM	MM	1018.1	4.5	MM	MM	MM	MM	MM

No – non numeric entries

8. What is a likely source of an abnormally high or low value to appear in a data measurement?

sensor malfunction?
power surge?

9. If there is an abnormally high or low value in a set of data, why is it important to remove it (that is, what problems could it cause)?

If used in calculating the data's statistics, will make calculations inaccurate.

10. Suppose wave height, air pressure, salinity and wind speed are measured at a buoy every 15 minutes over the course of a day and stored in a data file. Unfortunately, the time 0315 reading is missing (no measurements taken).

What can be done to fill in those values, if that reading is necessary?

interpolation

How do you know if the values filled in are accurate?

you don't, but you count on some consistency among adjacent readings.

Bonus: Who was the target of "The Jackal" in the book/movie "The Day of the Jackal."

Charles DeGaulle.