ENGR102: Engineering Problem Solving II
Project 1 – Home Appliances

Your task as project analyst is to perform a cost analysis for a family purchasing appliances for a new house. To complete the task you must write a Matlab program.

Table 1 lists the desired appliances. In your calculations, you must assume a cost of electricity in the new house of $0.0803444/kWh.

Table 1. Appliances required in the new house

Appliance
Dishwasher
Oven
Refrigerator
Microwave
Washer
Dryer

As indicated in table 2, each appliance has two options, each with its own initial cost, energy consumption, usage per day, and life expectancy.

Table 2. Data available for all appliances

Appliance	Option	Initial Cost (dollars)	Power Consumed (Watt)	Usage per day (hr)	Life Expectancy (yrs)
Dishwasher	1	349	1800	1.25	12
Dishwasher	2	598	852	1.25	12
Oven	1	2199	9600	1	19
Oven	2	700	12720	1	19
Refrigerator	1	1770	1411	7.5	14
Refrigerator	2	1200	725	7.5	14
Microwave	1	209	1000	0.5	9
Microwave	2	399	1500	0.5	9
Washer	1	349	1800	0.75	12
Washer	2	855	600	0.75	12
Dryer	1	449	5280	1.5	14
Dryer	2	899	7200	1.5	14

Solution expected in your Matlab code:

For each type of appliance, create a cost analysis over the expected life of the appliance.

1. Create a matrix that represents the data from table 2; save the matrix as Data.
2. Derive an equation of total cost that includes the initial purchase of the appliance plus the energy costs as a function of time (days).
3. Then, for each type of appliance, plot this cost as a function of time over the expected life span. You should have one plot for each type of appliance, with both options plotted together on the same axes. Your plots should be fully formatted (label all axes and add title to each plot).
4. From inspection of these plots, determine if the most cost effective option changes over the lifespan of the appliance. If so, plot vertical lines on those figures indicating times of five years and ten years. These lines should extend from the minimum of the plotted data to the maximum of the plotted data.
5. What is the best option for each appliance to be purchase? Explain your selection.

Present the options for each appliance in two tables. One table for appliance costs after living in the house for five years, and one for ten years. Include the initial cost and energy cost for the energy to run the appliances for the timeframe (either five or ten years). Your tables should have the following format:

Appliance Options and Costs for X year Timeframe				
Appliance	**Option 1 Purchase Price**	**Option 1 Energy Cost**	**Option 2 Purchase Price**	**Option 2 Energy Cost**
Dishwasher				
Oven				
Refrigerator				
Microwave				
Washer				
Dryer				

Deliverables:

a) Matlab Code (30%): Deadline: Tuesday March 1st (Must be individually done)

Individually submitted code that performs required calculations. Submit the .m file on ecampus and a hardcopy to your instructor. Your hardcopy must contain a cover page, editor window, command window, workspace, and figure windows.

b) **Gantt Chart (10%):** Deadline Thursday March 3rd.
Hardcopy submitted in class and softcopy must be loaded on eCampus. One submission per team. Group members will be announced during class.

c) Poster Presentation (15%): Deadline Tuesday March 8th

d) Technical Report (30%): Deadline: Thursday March 10th

Group members will be announced during class. The technical report must include a cover page, abstract, table of content, introduction, methodology, results, conclusions, references,

and an appendix. Submit a hardcopy during class and a softcopy on ecampus. One submission per group.

e) **Comprehension Quiz (15%)**: To be announced in class