

## Assignment 3 – Dynamic Programming

*This assignment is due by 3pm on Monday, May 24<sup>th</sup> and is worth 20% of your final grade. You can do this assignment in a group of up to three students, with a single submission.*

Your job with an Operations Research consulting company continues to go well. Your boss and client would like you to continue to work with Electrigrd to improve their supply and distribution of electricity in the region. Communications to you from their team will be provided through Blackboard.

There will be four communications, with the first appearing at 4pm on Friday, May 7<sup>th</sup>, and the final communication appearing at 4pm on Monday, May 16<sup>th</sup>.

You will need to prepare a report for your boss and a presentation to the client:

### *Section A – Report to your boss*

- A general formulation that describes the data, stages, states, actions and the transition and value functions used in your models. *6 marks*
- A single Python file with your implementations. This should be easy to relate back to the formulation. Your boss will attempt to execute this model. *6 marks*

### *Section B – Presentation to the client*

- The presentation should clearly and concisely address the needs of the client given through the communications. *4 marks*
- The presentation should explain the strategies for achieving the optimal values in the final three communications. *4 marks*

The presentation will be in the form of a recorded video. The video should be 8 minutes in length and feature each person in the group talking to camera (separately or together). We recommend using Zoom or Kaltura Capture – see the links on Blackboard for instructions.

Submit your report, Python file and video via Blackboard, using PDF for the report (saved from Word or created in LaTeX) and uploading the video with Kaltura Media mashup tool.

Only one submission per group is necessary but make sure all names are clearly shown on your report. Each student will receive separate data from the client but a group need only consider one data set in the report.

## Grading Criteria

Section A			
Marks	0	1	2
<b>Data</b>	Missing some or all descriptions of data	Correctly describes all data	
<b>Stages</b>	Missing clear description of stages	Correctly describes stages	
<b>States</b>	Incorrect or missing description of states	Correctly describes most states	
<b>Actions</b>	Incorrect or missing description of actions	Correctly describes most actions	
<b>Value function</b>	Incorrect or missing description of value functions	Correctly describes value function for one communication	Correctly describes value functions for all communications
<b>Python code</b>	There is no relationship between Python code and mathematical formulation	Python code mostly matches mathematical formulation	Python code clearly matches mathematical formulation
<b>Execution</b>	Python code fails to run	Python code runs but gives incorrect answer	Python code runs and gives correct answer
<b>Efficiency</b>	Python implementation is slow to run	Python implementation is efficient	
<b>Utility</b>	Difficult to determine optimal strategy from Python implementation	Easy to determine optimal strategy from Python implementation	
Section B			
Marks	0	1	2
<b>Slides</b>	Poorly formatted and difficult to follow	Concise addresses needs of client with few errors	Excellent proficiency in clearly and concisely addressing needs of client
<b>Response to communications</b>	Fails to address any of the client questions	Correctly addresses one client question	Correctly addresses all client questions
<b>Strategies</b>	Poor or missing description of optimal strategies for stochastic models	Good description of optimal strategies for stochastic models	Clear and insightful description of optimal strategies for stochastic models
<b>Presenters</b>	Not all group members are introduced.	All group members introduce themselves on camera.	
<b>Length</b>	Presentation too long or too short.	Presentation between 7 and 9 minutes in length.	