MATH3202 Operations Research & Mathematical Planning 2019

Assignment 3 – Dynamic Programming

This assignment is due by 1pm on Friday, May 24th and is worth 10% of your final grade. You can do this assignment in group of up to three, with a single submission.

Your job with an Operations Research consulting company is going well. Your boss and client would like you to continue working to help WonderMarket improve their operations.

The first communication will appear at 5pm on Tuesday 14th May with the final communication appearing on or before Monday, May 20th.

You will need to prepare a report which includes two main sections:

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 three models. *8 marks*
- A single Python file with your implementations. This should be easy to relate back to the formulations. Your boss will attempt to execute this model. *6 marks*

Section B – Report to the client

- Written responses that clearly and concisely address the needs of the client given through the communications. *6 marks*

Submit your report and Python files via Blackboard, using PDF for the report (saved from Word or created in LaTeX).

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**
Data	Missing some or all descriptions of data	Correctly describes all data	
Stages	Missing clear description of stages	Correctly describes stages	
States	Incorrect or missing description of states	Correctly describes state for one communication	Correctly describes states for all communications
Actions	Incorrect or missing description of actions	Correctly describes actions for one communication	Correctly describes actions for all communications
Value function	Incorrect or missing description of value functions	Correctly describes value function for one communication	Correctly describes value functions for all communications
Python code	There is no relationship between Python code and mathematical formulation	Python code mostly matches mathematical formulation	Python code clearly matches mathematical formulation
Execution	Python code fails to run	Python code runs but gives incorrect answer	Python code runs and gives correct answer
Efficiency	Python implementation is slow to run	Python implementation is efficient	
Utility	Difficult to determine optimal strategy from Python implementation	Easy to determine optimal strategy from Python implementation	

Section B			
Marks	**0**	**1**	**2**
Response to communications	Fails to address any of the client questions	Correctly addresses one client question	Correctly addresses all client questions
Written response	Poorly written response with frequent errors in grammar, spelling or technical language; and/or unnecessarily long	Concisely addresses needs of client with few errors in writing	Excellent proficiency in clearly and concisely addressing needs of client
Strategies	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