

Exercise	Pass ($\geq 40\%$)	Merit ($\geq 60\%$)	Distinction ($\geq 70\%$)
Exercise 1 Comparison and Discussion [Written Answers]	<p>Q1: Students should provide a simple, but correct, interpretation of the given results. We expect basic “say what you see” answers at this level.</p> <p>Q2: Students should demonstrate some understanding of the differences between Monte Carlo and Temporal-Difference methods. Students may not relate their explanations to the results.</p> <p>Q3: Students should demonstrate some understanding of the difference between on-policy and off-policy Temporal-Difference methods. Students may not relate their explanations to the results.</p> <p>Q4: Students should suggest basic, but reasonable, modifications that could improve the performance of their agents.</p>	<p>Q1: Students should provide a thorough description of the given results and comment on any notable qualitative or quantitative observations.</p> <p>Q2: Students should demonstrate a good understanding of the differences between Monte Carlo and Temporal-Difference methods. This understanding should be used to explain the results.</p> <p>Q3: Students should demonstrate a good understanding of the differences between on-policy and off-policy Temporal-Difference methods. They should use this understanding to explain the results and justify their expectations. Students may specify the features of Sarsa and Q-Learning that cause them to behave differently.</p> <p>Q4: Students should suggest reasonable modifications that could improve the performance of their agents. Students should clearly explain and justify their modification suggestions. Students may draw inspiration from their own results or the unit content to decide on appropriate modifications.</p>	<p>Q1: Students should provide a thorough and thoughtful discussion of the given results. Any notable qualitative or quantitative observations should be explained using the student’s understanding of the algorithms that have been implemented.</p> <p>Q2: Students should demonstrate a deep understanding of the differences between Monte Carlo and Temporal-Difference methods. Students should clearly link their explanations to what they observe in the results and may reference specific features of the different algorithms as being responsible for certain observations in the results.</p> <p>Q3: Students should demonstrate a deep understanding of the differences between off-policy and on-policy Temporal-Difference methods. Any expectations should be reasonable and well-justified. Students should clearly identify the features of Sarsa and Q-Learning that cause them to behave differently and explain why this is the case. References may be made to relevant examples from the literature.</p> <p>Q4: Students should suggest reasonable modifications that could improve the performance of their agents. These modifications should be well-justified, well-explained, and be targeted to address shortcomings in the relevant algorithm(s). Students may draw inspiration from their own results, the unit content, and their own background reading to decide on appropriate modifications.</p>

	<p>General: Explanations and points may be unclear and confused at times. Points may be made but not explained. Spelling and grammar may be poor.</p>	<p>General: Explanations should be clear, and arguments should be justified. Points should be backed up with explanations. Spelling and grammar should be correct.</p>	<p>General: Explanations and arguments should be clear. Arguments should reach natural and well-justified conclusions. Points should always be backed up with explanations and, where appropriate, linked to the results. Spelling and grammar should be correct.</p> <p><i>Marks above 70% will typically be rare.</i></p>
<p>Exercise 2a Modified Agent [Programming]</p>	<p>Performance: Students should implement an agent that noticeably improves on the performance of the basic Q-Learning agent. This improvement may come in the form of more efficient learning (i.e., achieving the same level of performance more quickly) or attaining a higher final average return.</p> <p>Implementation: Students will have correctly implemented one or two minor modifications to their agent, such as optimising hyperparameter values.</p> <p>General: Code should be well-organised and readable so that it is clear what modifications have been made, and how they work. This will help markers to verify that the student has correctly implemented the modifications in Exercise 2a that they have discussed in Exercise 2b.</p> <p>N.B. In cases where a student has correctly implemented their chosen modifications in Exercise 2a, but their chosen modifications do not lead to increased performance, partial credit will still be given if the student demonstrates a good understanding of this negative result in Exercise 2b.</p>	<p>Performance: Students should implement an agent that noticeably improves on the performance of the basic Q-Learning agent. This improvement may come in the form of more efficient learning (i.e., achieving the same level of performance more quickly) or attaining a higher final average return.</p> <p>Implementation: Students will have correctly implemented at least one major algorithmic modification, such as n-step learning.</p> <p>General: Code should be well-organised and readable so that it is clear what modifications have been made, and how they work. This will help markers to verify that the student has correctly implemented the modifications in Exercise 2a that they have discussed in Exercise 2b.</p>	<p>Performance: Students should implement an agent that noticeably improves on the performance of the basic Q-Learning agent. This improvement may come in the form of more efficient learning (i.e., achieving the same level of performance more quickly) or attaining a higher final average return.</p> <p>Implementation: Students will have correctly implemented at least two major algorithmic modifications, or at least one particularly impressive algorithmic modification that goes beyond the content covered in lectures.</p> <p>General: Code should be well-organised and readable so that it is clear what modifications have been made, and how they work. This will help markers to verify that the student has correctly implemented the modifications in Exercise 2a that they have discussed in Exercise 2b.</p> <p><i>Marks above 70% will typically be rare.</i></p>

<p>Exercise 2b Modified Agent [Written Answers]</p>	<p>Q1: Students should demonstrate a basic understanding of the modification(s) they have chosen to implement. At this level, students should clearly state what modifications have been implemented but might not discuss how they work.</p> <p>Q2: Students should clearly state the impact they expected their chosen modification(s) to have on their agent's performance. These expectations should be reasonable but, at this level, may not be justified.</p> <p>Q3: Students should provide a basic interpretation of their results, comparing their modified agent's performance with that of the basic Q-Learning agent, and state whether or not this met their expectations.</p> <p>N.B. Answers to Question 3 which simply state that their expectations were met, with reference to the reasons stated in their answer to Question 2, are failing answers.</p> <p>Q4: Students should propose one or more reasonable suggestions for further improving their agent's performance. At this level, suggestions may be basic and generic (e.g., hyperparameter tuning).</p>	<p>Q1: Students should demonstrate a good understanding of the modification(s) they have chosen to implement. At this level, students should clearly state what modifications have been implemented, as well as at least a high-level overview of how they work.</p> <p>Q2: Students should clearly state the impact they expected their chosen modification(s) to have on their agent's performance. These expectations should be reasonable and well-justified.</p> <p>Q3: Students should provide a thoughtful interpretation of their results, comparing their modified agent's performance with that of the basic Q-Learning agent and state whether or not this met their expectations. At this level, students may also start to link their modified agent's performance to specific features of the modifications they implemented.</p> <p>Q4: Students should propose one or more reasonable suggestions for further improving their agent's performance. At this level, proposed improvements should be non-trivial algorithmic improvements, and may be specifically targeted to improving upon the modifications that the student has already made.</p>	<p>Q1: Students should demonstrate a deep understanding of the modifications they have chosen to implement. At this level, students should clearly and precisely explain what modifications have been implemented and discuss how they work in an appropriate amount of detail.</p> <p>Q2: Students should clearly state the impact they expected their chosen modification(s) to have on their agent's performance, and clearly link their expectations to specific features of their chosen modifications in order to justify them.</p> <p>Q3: Students should provide a thoughtful interpretation of their results, comparing their modified agent's performance with that of the basic Q-Learning agent and state whether or not this met their expectations. At this level, students should clearly link their modified agent's performance to specific features of the modifications they implemented, and to their expectations.</p> <p>Q4: Students should propose one or more reasonable suggestions for further improving their agent's performance. At this level, proposed improvements should be non-trivial algorithmic improvements, and may be specifically targeted to improving upon the modifications that the student has already made. The student should also demonstrate a good understanding of how their suggested improvements work and justify their choices.</p>
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