Student Name: _____ Student ID # _____

Question 1: Architectures & RCS (20 points)

Murphy lists five components common to most hybrid deliberative/reactive architectures. Can you find these five components in RCS? **Explain your answer.**

Question 2: Architectures & RCS Again (20 points)

Of the hybrid deliberative/reactive architectural styles described by Murphy (i.e., managerial, state-hierarchy, etc.), which most closely matches RCS? **Explain your answer.**

Question 3: Topological Path Planning (20 points)

Which of the following can be optimized in a path planned using topological path planning? **Explain your answers.**

A. Path Length

B. Traversability of Terrain

C. Number of Turns

D. Distance from Mapped Obstacles

Question 4: Metric Path Planning (20 points)

A. Give one *advantage* of using a fine resolution for a map compared to using a coarse resolution. **Explain your answer.**

B. Give one *disadvantage* of using a fine resolution for a map compared to using a coarse resolution. **Explain your answer.**

C. Give an example of an environment in which a multi-resolution grid (such as a quadtree) will use *less* space for its data structures than a uniform resolution grid. Assume that the finest resolution of the multi-resolution grid is the same as the resolution of the uniform resolution grid. **Explain your answer.**

D. Give an example of an environment in which a multi-resolution grid (such as a quadtree) will use *more* space for its data structures than a uniform resolution grid. Assume that the finest resolution of the multi-resolution grid is the same as the resolution of the uniform resolution grid. **Explain your answer.**

Question 5: Localization and Mapping (20 points)

A. You need to create a map of a building. You have a robot with exactly one sensor: a color camera. Would you choose to have the robot create a metric map or a topological map? **Explain your answer.**

B. Given your answer to part A, what constitutes localization for this robot? **Explain your answer.**

C. You need to create a map of a building. You have a robot with exactly two sensors: a bump sensor and an optometry sensor that lets you measure distance moved and angle turned. Would you choose to have the robot create a metric map or a topological map? **Explain your answer.**

D. Given your answer to part C, what constitutes localization for this robot? **Explain your answer.**