**Project 5\_Phase1 \_\_ Proposal format**

**Title (0.1 points)** Multithreaded Multidirectional RRT\* (MMRRT\*)

**Introduction (0.25 point)**

* Definitions

RRT\*

Multithreading - using multiple threads (or processes in Python) to simultaneous perform actions. In this case, we would like to simultaneous perform search of multiple nodes.

* Background

Insert RRT\* definition

* Literature review

Insert papers from marcus

Insert RRT\* paper

**Goal (0.15 points)**

* Option 1, 2 or 3: Option 2
* Simulation or real-world implementation: Simulation in Gazebo
* Outcome of the project: Implement Multithreaded Multidirectional RRT\* in Python to perform speedy path planning, and show successful path on Gazebo Sim in a video demo. Will also provide a GitHub repo with code.

**Method (1 points)**

This section should include:

* Path planning Method
* Title of the paper/papers that you will implement or use (provide the pdf files
* List of software and package that you are planning to use
* Hardware requirements

We will be using RRT\* for path planning, with additional multi-directional search with multiple threads.

Insert RRT\* paper and marcus paper

Software we will likely use is below:

* Pygame (initial path visualization)
* Python’s multiprocessing library
* ROS Gazebo

Hardware

* Insert pc we are using????

**Timetable (0.25 points)**

* Break down the project to tasks and subtasks
* Put your time estimation for each task and subtasks

Tasks

* Implement RRT\*
* Implement multithreading
  + Find way to choose “promising nodes” during search
  + Spawn new thread to explore promising node
* Pygame visualization
  + Visualize simultaneous exploration
* Test in Gazebo

**References (0.25 points)**

Add RRT\* paper

Add marcus paper