2D Flight Simulator
Software Requirement Specification

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1 Introduction

This document describes the software requirements of a simple 2D flight simulator.

2 Classes

2.1 Control_Policy

2.1.1 Variables

2.1.1.1 diam

2.1.1.1.1 Control_Policy shall contain a maximum size of a circle *diam*

2.1.1.2 num_sides

2.1.1.2.1 Control_Policy shall contain a number of sides of a polygon *num_sides*

2.1.1.2.2 *num_sides* shall be greater than or equal to 3

2.1.1.3 polygon

2.1.1.3.1 Control_Policy shall contain a representation of a polygon *polygon*

2.1.2 Constructor

2.1.2.1 The constructor shall initialize the vertices of *polygon* with *num_sides* sides that is circumscribed by a circle of diameter *diam*

2.1.3 get_next_pose

2.1.3.1 *get_next_pose* shall return a position and angle for a point a specified distance away from another point on *polygon*

2.2 Aircraft

2.2.1 Variables

2.2.1.1 x_position

2.2.1.1.1 Aircraft shall contain a horizontal position *x_position*

2.2.1.1.2 *x_position* shall be in the range [0, *width*] as specified in 2.3.1.1

2.2.1.2 y_position

2.2.1.2.1 Aircraft shall contain a vertical position *y_position*

2.2.1.2.2 *y_position* shall be in the range [0, *height*] as specified in 2.3.1.2

2.2.1.3 heading

2.2.1.3.1 Aircraft shall contain a direction *heading*

2.2.1.3.2 *heading* shall be in the range $[-\pi, \pi)$

2.2.1.4 max_vel

2.2.1.4.1 Aircraft shall contain a maximum linear velocity *max_vel*

2.2.1.5 max_ang_vel

2.2.1.5.1 Aircraft shall contain a maximum angular velocity *max_ang_vel*

2.2.1.6 vel

2.2.1.6.1 Aircraft shall contain a linear velocity *vel*

2.2.1.6.2 *vel* shall be less than *max_vel* as specified in 2.2.1.4

2.2.1.7 ang_vel

2.2.1.7.1 Aircraft shall contain an angular velocity *ang_vel*

2.2.1.7.2 The magnitude of *ang_vel* shall be less than *max_ang_vel* as specified in 2.2.1.5

2.2.1.8 policy

2.2.1.8.1 Aircraft shall contain only one Control_Policy *policy* as specified in 2.1

2.2.2 Constructor

2.2.2.1 The constructor shall initialize an Aircraft with user-defined initial conditions

2.2.3 update_pose

2.2.3.1 *update_pose* shall calculate the maximum amount Aircraft can move at its current *vel* and *ang_vel* and call *get_next_pose* as specified in 2.1.3

2.3 Simulator

2.3.1 Variables

2.3.1.1 width

2.3.1.1.1 Simulator shall contain a width *width*

2.3.1.1.2 *width* shall be greater than 0

2.3.1.2 height

2.3.1.2.1 Simulator shall contain a height *height*

2.3.1.2.2 *height* shall be greater than 0

2.3.1.3 rate

2.3.1.3.1 Simulator shall contain a rate *rate* at which to update

2.3.1.3.2 *rate* at which to update shall be greater than 0

2.3.2 Constructor

2.3.2.1 aircraft

2.3.2.1.1 Simulator shall contain Aircraft *aircraft* as specified in 2.2

2.3.2.1.2 *aircraft* shall be greater than or equal to 0

2.3.3 Constructor

2.3.3.1 The constructor shall initialize an Simulator with user-defined initial conditions

2.3.3.2 The constructor shall call *update_simulator* as specified in 2.3.4 at the rate *rate* as specified in 2.3.1.3

2.3.4 update_simulator

2.3.4.1 *update_simulator* shall *update_pose* for each Aircraft in *aircraft* as specified in 2.2.3

3 Completion Time

q1: 1.5 hr
q2: 2.5 hr
q3: 1.5 hr
q4: 3.0 hr
q5: 0.5 hr
total: 9.0 hr