**Unit Testing for Particle Class Methods**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Method | Test Description | Input Condition | Expected Output | Actual Output | Test Result |
| **\_\_init\_\_test()**  for the \_\_init\_\_() in main program. | Testing if the constructor method in the Particles class is creating a particle correctly and giving it the correct attributes. | 5 input arguments, the first must be ‘1’ or equivalent to represent a particle. The next arguments are town, particles, y and x. These should be defined outside the test function.  Example Input:  town = “the town info”  particles = “the other particles’ info”  \_\_init\_\_test(1, town, particles, 150, 50) | The information printed in the console will show that the constructor function is correctly assigning the attributes defined to the particle. | When the example input is used, the console shows that the town data and particle data are attributes of the particle. A height has also been given to the particle to show constructor method is working. | Test passed |
| **spread\_test()**  for the spread() in main program. | Testing if the ‘Spread’ method in the Particles class is moving the particles in the correct direction depending on the random integer generated. | 5 input arguments, the first must be ‘1’ or equivalent to represent a particle. Next 4 inputs are the East, West, North, South percentage probabilities. All must be integer values only and 4 directional probs must have a sum equal to 100.  Example Input:  spread\_test(1, 30, 40, 20, 10) | The information printed in the console will show that the particle has been moved in the correct direction, depending on the chance/random integer 1-100 that has been generated. | When the random seed is set to 0 and the example input, is used, the console shows particle has been moved west and the x coord is adjusted.  This is correct as the chance in this case equals 50, which falls in the 40% West percentage probability set. | Test Passed |
| **spread\_test()**  for the spread() in main program. | Testing if the ‘Spread’ method in the Particles class does not run if directional probabilities do not sum to 100%. | 5 input arguments, the first must be ‘1’ or equivalent to represent a particle. Next 4 inputs are the East, West, North, South percentage probabilities. All must be integer values only and now sum of probabilities does not equal 100.  Example Input:  spread\_test(1, 50, 50, 50, 50) | The method should not run as the condition for all East, West, North, South probs do not sum to 100%. | When the random seed is set to 0 and the example input, is used, the console prints the error message to say the code will not run. | Test passed |
| **turbulence\_test()**  for the turbulence() in main program. | Testing if the ‘Turbulence’ method in the Particles class is moving the particles up or down, depending on the random integer generated. | 4 input arguments, the first must be ‘1’ or equivalent to represent a particle. Next 3 inputs are the Rise 20%, Same 10 %, Fall 70% percentage probabilities. All are integer values.  Example Input:  turbulence\_test(1, 20, 10, 70) | The information printed in the console will show that the particle has been moved upwards, not moved or fallen down, depending on the chance/random integer 1-100 that has been generated. | When the random seed is set to 0 and the example input, is used, the particle is above 75m and is dropped. This is correct, since the chance in this case equals 98, which means it should fall. | Test Passed |