Rocket Launch Simulator Programming Exercise

import java.util.Scanner;

class Rocket {

int stage;

int fuel;

int altitude;

int speed;

int timeElapsed;

boolean checksCompleted;

boolean missionStarted;

Rocket() {

this.stage = 1;

this.fuel = 100;

this.altitude = 0;

this.speed = 0;

this.timeElapsed = 0;

this.checksCompleted = false;

this.missionStarted = false;

}

}

public class RocketLaunchSimulator {

private static final int FUEL\_CONSUMPTION\_RATE = 10;

private static final int SPEED\_INCREASE\_PER\_SECOND = 1000;

private static final int ALTITUDE\_INCREASE\_PER\_SECOND = 10;

private static final int LAUNCH\_DURATION = 10; // Duration for which fuel and speed are simulated

public static void startChecks(Rocket rocket) {

if (rocket.checksCompleted) {

System.out.println("Pre-Launch Checks: Checks already completed.");

} else {

rocket.checksCompleted = true;

System.out.println("Pre-Launch Checks: All systems are 'Go' for launch.");

}

}

public static void launch(Rocket rocket) {

if (!rocket.checksCompleted) {

System.out.println("Launch failed. Please complete pre-launch checks first.");

return;

}

rocket.missionStarted = true;

System.out.println("Launch initiated...");

}

public static void fastForward(Rocket rocket, int seconds) {

if (!rocket.missionStarted) {

System.out.println("Mission not started. Please type 'launch' to start the simulation.");

return;

}

if (rocket.fuel <= 0) {

System.out.println("Mission Failed due to insufficient fuel.");

rocket.missionStarted = false;

return;

}

for (int i = 0; i < seconds; i++) {

if (rocket.fuel <= 0) {

System.out.println("Mission Failed due to insufficient fuel.");

rocket.missionStarted = false;

return;

}

rocket.fuel -= FUEL\_CONSUMPTION\_RATE;

rocket.altitude += ALTITUDE\_INCREASE\_PER\_SECOND;

rocket.speed += SPEED\_INCREASE\_PER\_SECOND;

rocket.timeElapsed += 1;

if (rocket.fuel <= 0) {

System.out.println("Mission Failed due to insufficient fuel.");

rocket.missionStarted = false;

return;

}

if (rocket.timeElapsed >= LAUNCH\_DURATION) {

System.out.println("Orbit achieved! Mission Successful.");

rocket.missionStarted = false;

return;

}

System.out.printf("Stage: %d, Fuel: %d%%, Altitude: %d km, Speed: %d km/h%n",

rocket.stage, rocket.fuel, rocket.altitude, rocket.speed);

try {

Thread.sleep(1000); // Simulate real-time passage

} catch (InterruptedException e) {

Thread.currentThread().interrupt();

}

}

}

public static void main(String[] args) {

Rocket rocket = new Rocket();

Scanner scanner = new Scanner(System.in);

String command;

int seconds;

System.out.println("Welcome to the Rocket Launch Simulator");

while (true) {

System.out.print("Enter command: ");

command = scanner.nextLine().trim();

if (command.startsWith("start\_checks")) {

startChecks(rocket);

} else if (command.startsWith("launch")) {

launch(rocket);

} else if (command.startsWith("fast\_forward")) {

try {

seconds = Integer.parseInt(command.split(" ")[1]);

fastForward(rocket, seconds);

} catch (Exception e) {

System.out.println("Invalid format for fast\_forward command.");

}

} else {

System.out.println("Unknown command.");

}

}

}

}