Programming Project

This small project will give you more experience on the use of:

1. classes
2. class methods
3. object-oriented programming

The goal of this project is to gain more practice with classes and Object-Oriented Programming (OOP). OOP is a very popular programming paradigm and supported by Python very well.

Task

Your task is to implement the simple elevator in Python using classes. The default strategy is the simple "start at the bottom, go to the top, then go to the bottom".

Project Description / Specification

1. Create three classes: Building, Elevator, and Customer.
2. Equip the building with an elevator. Ask the user to customize the number of floors and the number of customers.
3. Program should have error checking to make sure the user inputs are valid. For example, if a user gives non-integer inputs, notify the user that the inputs are incorrect and prompt again.
4. Each customer starts from a random floor, and has a random destination floor.
5. Each customer will use the elevator only once, i.e., when a customer moves out of the elevator, he/she will never use it again.
6. When all customers have reached their destination floor, the simulation is finished.
7. All classes' methods require a docstring for a general description of the method.

Notes and Hints:

Here are some suggested attributes and methods. Note that you needn't follow these faithfully.

Class	Attribute/Method	Explanation
Building	num_floors	The number of floors
	customer_list	The list of customers
	elevator	The elevator equipped in the building
	run(self)	The method to operate the elevator
	output(self)	Output the building (check the demo program)

Class	Attribute/Method	Explanation
Elevator	num_floors	The number of floors
	in_elevator_list	The list of customers in the elevator
	cur_floor	The current floor of the elevator
	direction	The direction of the elevator
	move(self)	The method to move the elevator by 1 floor
	register_customer(self, customer)	A customer goes into the elevator
	cancel_customer(self, customer)	A customer goes out of the elevator

Class	Attribute/Method	Explanation
Customer	cur_floor	The current floor of the elevator
	dst_floor	The destination floor of the elevator
	name/ID	The customer's name/ID

in_elevator	The flag to denote whether he/she is in the elevator
finished	The flag to denote whether he/she has reached dst_floor

Notes and Hints

In your main function, at the beginning ask the user for the number of floors and the number of customers which can be used to create an instance of Building. Then we only need to call the run() method and output() method repeatedly in a while loop.

Randomly select the floors (to and from) for each customer. Use the randint function from the random module (look it up in the Python documentation)