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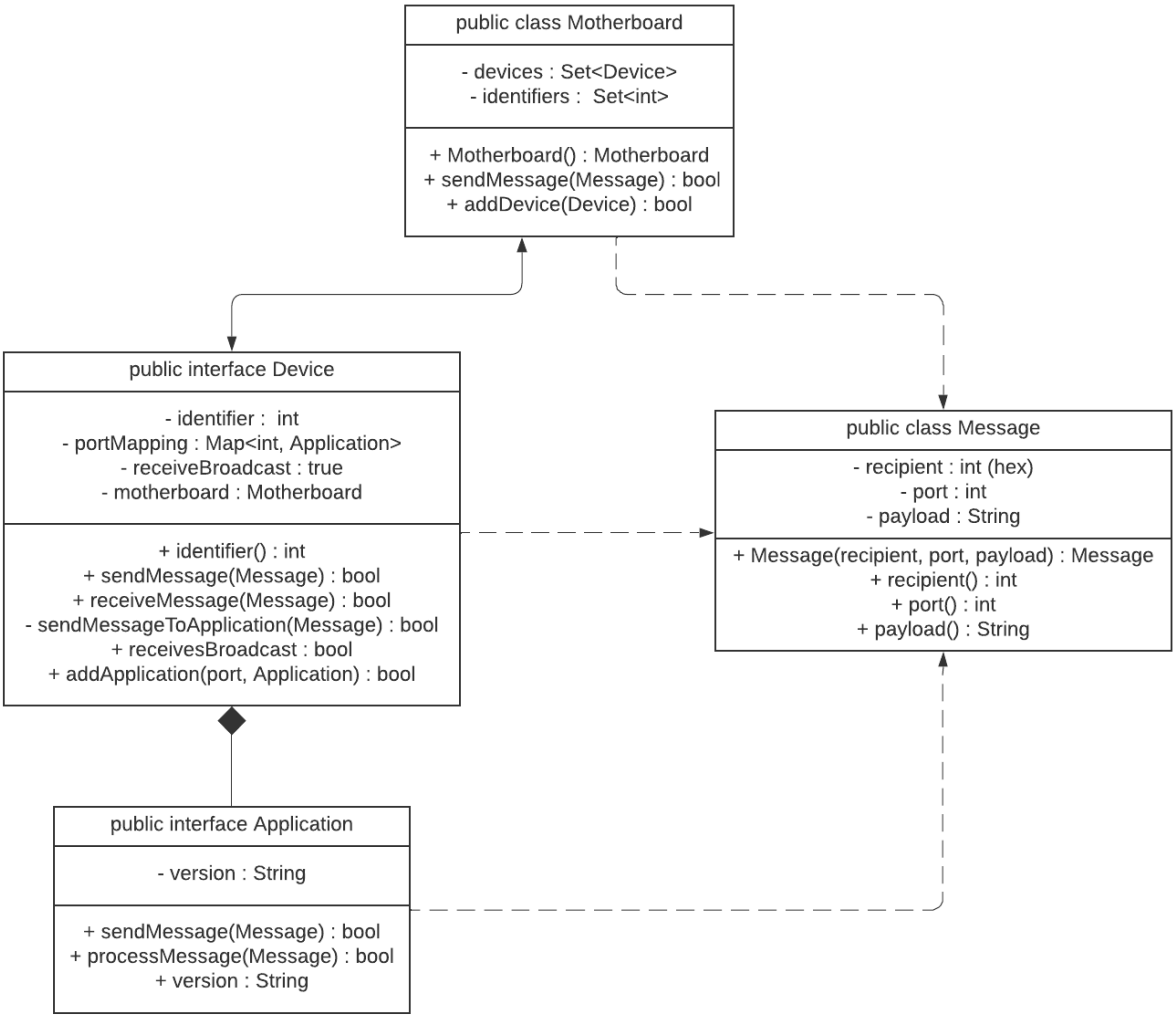
Design Document for a PCIc Protocol

Requirements and Objectives

- Connect devices on a computer motherboard
    - Some devices are: SSD, Wi-Fi, ethernet, and graphics cards
- Both messages and devices can be configured so that the effect of receiving a message depends both on the message control flags and on the device configuration
- Messages are transmitted from one device to another
- A message can be broadcast from one device to all other connected devices
- The messages consist of three parts:
    - Recipient identifier
        - Unique identifier that denotes the intended recipient of the message
        - Will either be a single device or all of them
    - Port identifier
        - Assings the message to a specific application on the receiving device
    - Payload
        - Binary string representing the message contents
- Different devices can assign port numbers to different applications
- Before the computer is assembled, the various devices are associated with a recipient identifier and with the mapping of ports to applications
    - Then they are plugged into the motherboard

Architecture



Error-Handling

- Return a bool that represents whether the message was sent / received successfully
- Use local error handling so that there's no extra overhead and less coupling
- Log any errors and try to be robust

Unit Testing

- Aim for high code coverage
- Generate more tests based on branch coverage, boundaries, dataflow, etc.

Stress Testing

- Send many messages at the same time from many devices and applications