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# PROJECT TOOLS

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# TOOLS AND TECHNOLOGIES USED

- Programming Language: Python
- Libraries:
  - ipaddress: Used for IP address manipulation and validation.
  - os: Used for executing system commands and interacting with the operating system.
  - datetime: Used for capturing timestamps and measuring execution time.
  - platform: Used for retrieving information about the operating system.
  - re: Used for regular expression pattern matching.
  - socket: Used for creating TCP sockets and performing network operations(port Scanning).
  - threading: Used for concurrent execution of tasks using threads.
  - queue: Used for managing a queue of tasks in a thread-safe manner.

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# IMPLEMENTATION DETAILS

- **Input Validation**

The project incorporates input validation to ensure that the provided IP address is in a valid format. The `validate_ipaddress()` function uses the `ipaddress` library to validate the IP address format and handle any potential errors.

- **IP Address Generation**

To facilitate scanning multiple IP addresses, the project dynamically generates a list of valid IP addresses based on the user's input. Starting from an initial IP address, the code increments the IP address by 1 using the `ipaddress.IPv4Address()` function. This process is repeated until the desired number of IP addresses is generated

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# IMPLEMENTATION DETAILS

- **IP Address Availability Check**

The project begins by validating and checking the availability of IP addresses. The `ping()` function is implemented using system commands (`ping`) to send ICMP echo requests to IP addresses. The availability of an IP address is determined based on the response received. This functionality is implemented differently for Windows and Linux operating systems to accommodate the differences in the ping command syntax.

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# IMPLEMENTATION DETAILS

- **Port Scanning**

- The project performs port scanning by creating TCP sockets and attempting to establish connections to specific ports on the scanned IP addresses. The `scanner()` function is responsible for establishing a TCP connection to a given IP address and port. If the connection is successful, the port is considered open, and the result is printed. The `threader()` function is used to distribute the scanning tasks among multiple threads for improved efficiency.

