1   Ubuntu Virtual Machine Specifications

- **Host Machine**: Windows 11

- **Virtualization Software**: VirtualBox

- **Base System**:

  - ✓ **Device Name**: DESKTOP-LRMR5I7

  - ✓ **Processor**: Intel® Core™ i5-8350U CPU @ 1.70GHz (4 Cores allocated)

  - ✓ **Installed RAM**: 8GB (7.86GB usable)

- **Virtual Machine (Ubuntu LTS) Configuration**:

  - ✓ **Allocated CPU Cores**: 4

  - ✓ **Allocated RAM**: 4GB

  - ✓ **Disk Space**: 25 GB

  - ✓ **Graphics Acceleration**: *VBoxSVGA*

2   Result Summary

1.   **Thread Scaling**

- Execution time **decreases** with more threads up to the allocated CPU cores.

- Beyond this, slight overhead increases occur but drop again at multiples of core counts.

2.   **Matrix Scaling**

- Execution time **grows exponentially** with matrix size.

- Larger matrices face memory bandwidth and cache limitations, impacting performance