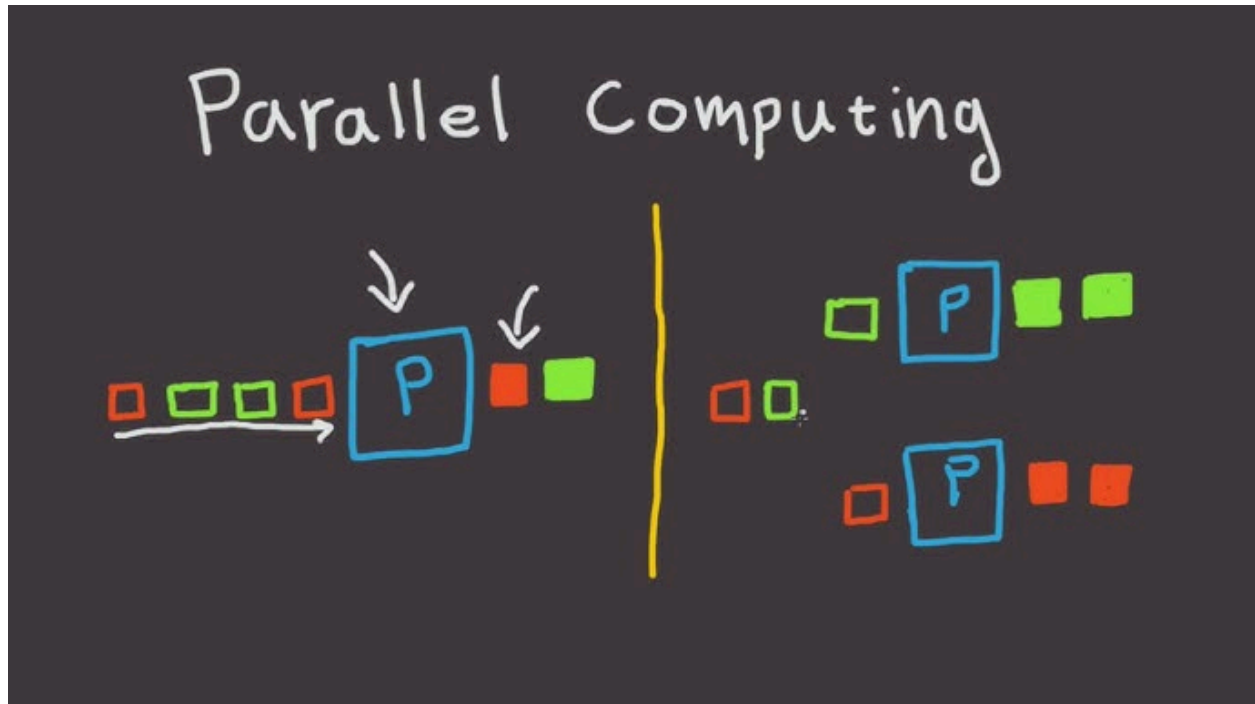


Mohammed Areeb Hussain

ME21BTECH11033

ME5470 Introduction to Scientific Parallel Computing

Assignment 1



Q1)

```
(base) areebhussain@Areebs-MacBook-Pro Assignment 1 % du -sh array_004000_asc.out
320M   array_004000_asc.out
(base) areebhussain@Areebs-MacBook-Pro Assignment 1 % du -sh array_004000_bin.out
122M   array_004000_bin.out
(base) areebhussain@Areebs-MacBook-Pro Assignment 1 %
```

$$8 * 4000 * 4000 / (1024 * 1024)$$
$$8 * 4000 * 4000 / (1024 * 1024) = 122.0703125$$

The size of the data in the memory is estimated to be 122 MB, close to the value for BIN file ASCII file format, despite being easier to read, takes more space, around 300 MB.

Q2)

Notation.

$$A*v=v\_new=\lambda*v$$

For this question, the code tests the edge conditions first, testing for division by 0 error(  $\lambda$  tends to infinity), then for  $\lambda=0$ (final vector after multiplying  $A*v=0$ ).

Next, it tests for  $\lambda$  and takes the first non zero elements in vector  $v$ . It calculates the  $\lambda$  value, then continues one by one till the next non zero element in  $v$ . If the  $\lambda$  calculated is within the allowed error margin(to account for storage errors in floating point numbers), then the code proceeds until all elements are checked. If it exceeds the margins, the code returns and states that the vector is not an eigenvector. Otherwise, it shows the eigenvalue as required.