HW1 Report

Question 1)

a)

```
co21btech11008@edison9:~/ParallelScientificComputing/HW1$gcc Q1.c -std=c99
co21btech11008@edison9:~/ParallelScientificComputing/HW1$./a.out
Format flag(0(ascii) or 1(binary)):0
co21btech11008@edison9:~/ParallelScientificComputing/HW1$./a.out
Format flag(0(ascii) or 1(binary)):1
co21btech11008@edison9:~/ParallelScientificComputing/HW1$ls
a.out  array_004000_asc.out  array_004000_bin.out  inputfiles  input.in  Q1.c  Q2.c
co21btech11008@edison9:~/ParallelScientificComputing/HW1$du -sh array_004000_asc.out
382M    array_004000_asc.out
co21btech11008@edison9:~/ParallelScientificComputing/HW1$du -sh array_004000_bin.out
62M     array_004000_bin.out
```

The code takes the format_flag value from the user and n from the file input.in which is in the same directory as Q1.c.
The size of array_004000_asc.out is 382M.
The size of array_004000_bin.out is 62M.

b)

4000*4000*8 = 128000000 bytes = 128MB
The size in the memory is 128MB.
The size of the file on disk is 382MB. This is because of the large number of small files and cluster size. Mostly the size on disk is much greater than the actual file size.
The binary format is best suited for storing extensive data as it takes less space (can be seen in (a)).

Question 2)

```
co21btech11008@edison9:~/ParallelScientificComputing/HW1$ls
a.out  array_004000_asc.out  array_004000_bin.out  inputfiles  input.in  Q1.c  Q2.c
co21btech11008@edison9:~/ParallelScientificComputing/HW1$gcc Q2.c -std=c99
co21btech11008@edison9:~/ParallelScientificComputing/HW1$./a.out
Reading the data from input files for n=3
Done reading data from the input files for n=3
vec_000003_000001.in: Yes : -6.000000e+00
vec_000003_000002.in: Yes : -6.000000e+00
vec_000003_000003.in: Yes : -1.000000e+00
vec_000003_000004.in: Not an eigenvector
Reading the data from input files for n=5
Done reading data from the input files for n=5
vec_000005_000001.in: Yes : 2.680981e-01
vec_000005_000002.in: Not an eigenvector
vec_000005_000003.in: Yes : 9.868750e-01
vec_000005_000004.in: Yes : 1.399039e+00
Reading the data from input files for n=50
Done reading data from the input files for n=50
vec_000050_000001.in: Not an eigenvector
vec_000050_000002.in: Yes : 4.796282e-01
vec_000050_000003.in: Yes : 1.337887e+00
vec_000050_000004.in: Not an eigenvector
Reading the data from input files for n=80
Done reading data from the input files for n=80
vec_000080_000001.in: Yes : 3.330178e-01
vec_000080_000002.in: Yes : 4.931420e-01
vec_000080_000003.in: Yes : 9.392745e-01
vec_000080_000004.in: Not an eigenvector
```

The inputfiles folder should be in the same directory as the Q2.c. The eigenvalues (if they exist) can be seen in the picture for every vector.