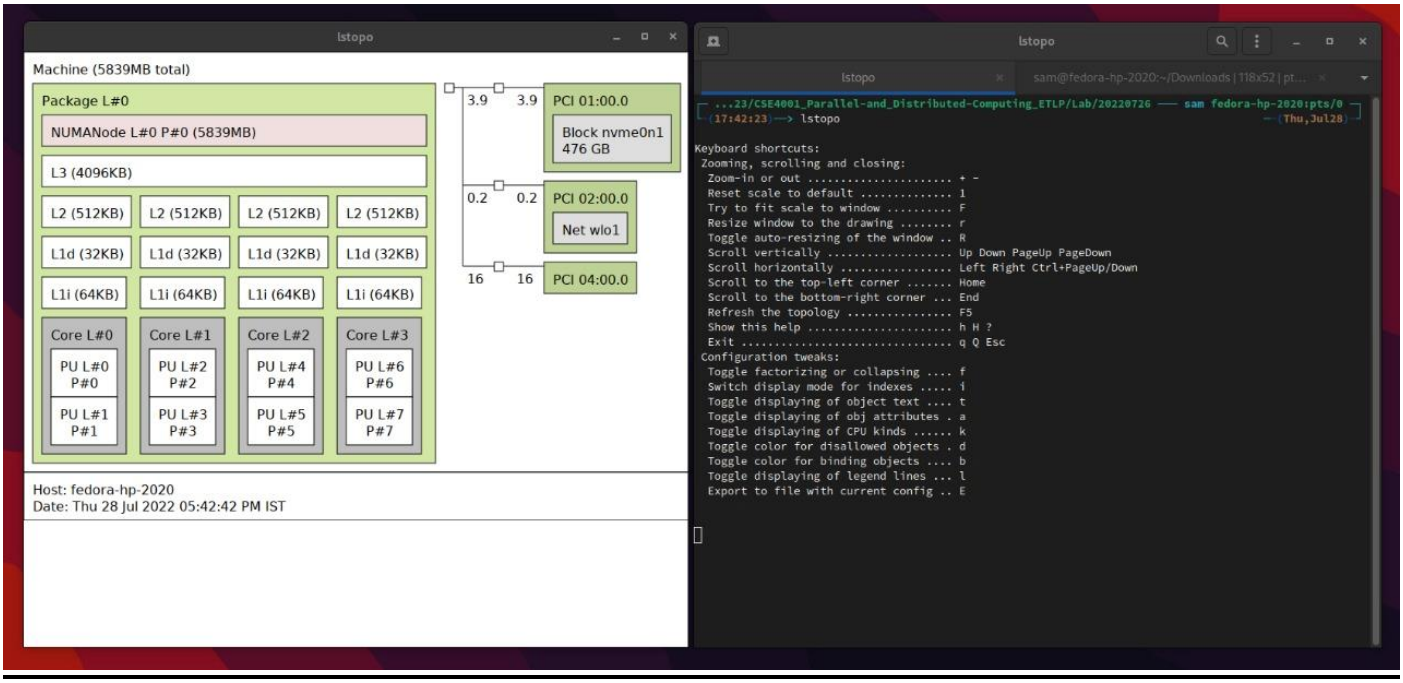
20BCE1550
Samridh Anand Paatni
CSE4001 Lab 01
PThreads

Q1. Display the processors layout of your system.

The output for the command **`lstopo`**, after installing the hwloc package:



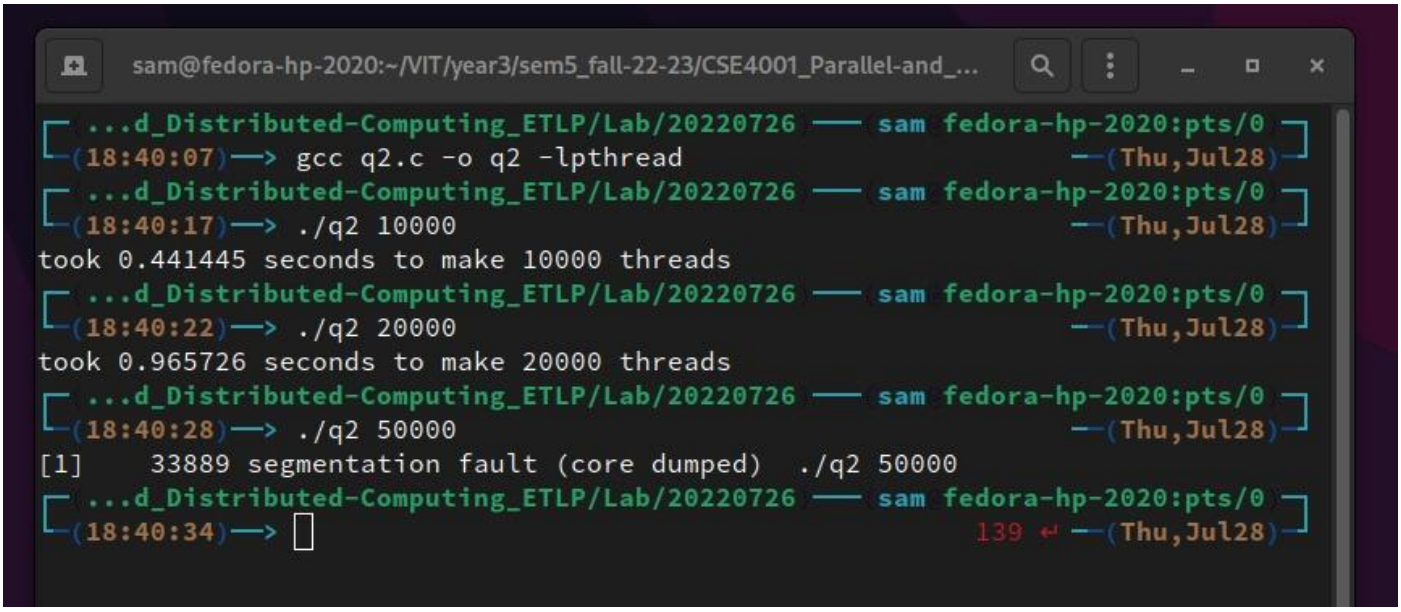
Q2. Write a multithreaded program in C to create 10k, 20k and 50k threads and measure the time taken for each thread group.

C Code:

```c
#include<stdio.h>
#include<stdlib.h>
#include<pthread.h>
#include<time.h>

void * void_function(void *message) {}

int main(int argc, char * argv[]) {
    pthread_t * threads;
    int num_threads = atoi(argv[1]); // because the cli argument is an ASCII code

    threads = (pthread_t *) calloc(num_threads, sizeof(pthread_t));

    clock_t t = clock();

    for (int i = 0; i < num_threads; i++) {
        pthread_create(&threads[i], NULL, void_function, NULL);
    }

    for (int i = 0; i < num_threads; i++) {
        pthread_join(threads[i], NULL);
    }

    t = clock() - t;

    printf(
        "took %f seconds to make %d threads\n",
        ((double) t)/CLOCKS_PER_SEC,
        num_threads
    );

    free(threads);

    return 0;
}
```

Output:

Creating 5000 pthreads resulted in a segmentation fault.



Q3. Write a program to create 2 threads. Thread 1 has to print “PDC” and thread 2 has to print “lab”.

C Code:

```c
#include<stdio.h>
#include<pthread.h>

void * message_function(void *message) {
    printf("%s\n", ((char *) message));
}

int main() {
    pthread_t t1, t2;

    char *m1 = "Thread 1: PDC";
    char *m2 = "Thread 2: Lab";

    pthread_create(&t1, NULL, message_function, (void *) m1);
    pthread_create(&t2, NULL, message_function, (void *) m2);

    pthread_join(t1, NULL);
    pthread_join(t2, NULL);

    return 0;
}
```

Output: