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CS342-002
HW3

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Q1)

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

//good practice to enlist the functions already/beforehand

```
void * avgthread(void * param);
void * minthread(void * param);
void * maxthread(void * param);
```

// size of array

```
int MAXSIZE = 1000;
```

// maximum number of threads

```
int THREADCOUNT = 3;
```

```
int lower = 1;
```

```
int upper = 100;
```

```
int array[1000];
```

```
int count = 0;
```

```
int minimum = 0;
```

```
int maximum = 0;
```

```
double average = 0;
```

```
void * avgthread(void * param)
```

```
{
```

```
    int i;
```

```
    printf("1st thread \n");
```

```
    for (i = 0; i < MAXSIZE; i++) {
```

```
        count += array[i];
```

```
    }
```

```
    average = count / MAXSIZE;
```

```
    pthread_exit(NULL);
```

```
}
```

```
void * minthread(void * param)
```

```

{

printf("2nd thread \n");
minimum = array[0];
for (int i = 0; i < MAXSIZE; i++)
{

    if(array[i] < minimum){
        minimum = array[i];
    }
}
pthread_exit(NULL);
}

```

```

void * maxthread(void * param)
{

printf("3rd thread\n");
for (int j = 0; j < MAXSIZE; j++)
{

    if(array[j] > maximum){
        maximum = array[j];
    }
}
pthread_exit(NULL);
}

```

// Driver Code

```

int main()
{

//Generate random number
for(int i = 0; i < 1000; i++)
{
    array[i]= rand() % 1000;
}

```

pthread_t threads[THREADCOUNT]; //array of thread creations

// Creating 3 threads

```

pthread_create(&threads[0], NULL, avgthread, (void*)NULL);
pthread_create(&threads[1], NULL, minthread, (void*)NULL);
pthread_create(&threads[2], NULL, maxthread, (void*)NULL);

```

```

// waiting for completion
for (int i = 0; i < THREADCOUNT; i++) {
    pthread_join(threads[i], NULL);
}

printf("average = %f \n", average);
printf("minimum = %d \n", minimum);
printf("maximum = %d \n", maximum);

return 0;
}

```

Q3)

Considering 1 as the time taken to execute, then:

$1 / (0.25) + (0.75 / 8) = 2.906$ is the approximation for speed up.

The limit is achieved when threads are infinite; $1/0.25 + (0) = 4$

4 is the limit

Q4)

q = 30 ms

Process	Finish Time	Waiting Time
A	81	31
B	223	128
C	203	128
D	132	57
E	243	128

q = 10 ms

Process	Finish Time	Waiting Time
A	124	74
B	249	154
C	186	111
D	145	70
E	238	123

$q = 0.3 \text{ ms}$

Process	Finish Time	Waiting Time
A	224	174
B	327	232
C	242	167
D	171	96
E	294	179

SRJF

Process	Finish Time	Waiting Time
A	50	0
B	240	145
C	110	35
D	75	0
E	160	45

FCFS

Process	Finish Time	Waiting Time
A	50	0

Process	Finish Time	Waiting Time
B	130	35
C	170	95
D	190	115
E	240	125

Q5)

Initial assumption = 20

3 bursts of lengths 24, 18, and 30

assuming $\alpha = 0.4$

∴

$$T_1 = (0.4)(24) + (0.6)(20) = 21.6$$

$$T_2 = (0.4)(18) + (0.6)(21.6) = 20.16$$

$$T_3 = (0.4)(30) + (0.6)(20.16) = 24.096$$

24.096 Ans.