National Textile University

Department of Computer Science

Subject:

Operating System

Submitted to:

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Reg number:

23-NTU-CS-1141

Lab Evaluation

Semester: 5th

Task 1:

Write a C program that finds the maximum value in an array using threads:

1. Create an array of 20 integers with values:

[45, 23, 67, 89, 12, 34, 78, 90, 56, 21, 38, 72]

44, 91, 15, 83, 29, 66, 54, 88}

2. Create 4 threads, each finding maximum in 5 elements: Thread 1: elements 0-4

Thread 2: elements 5-9

Thread 3: elements 10-14

Thread 4: elements 15-19

3. Pass the starting index and count to each thread using a structure

4. Each thread:

Finds maximum in its portion

Prints the maximum value it found Returns the maximum value

5. Main thread collects all return values and finds overall maximum

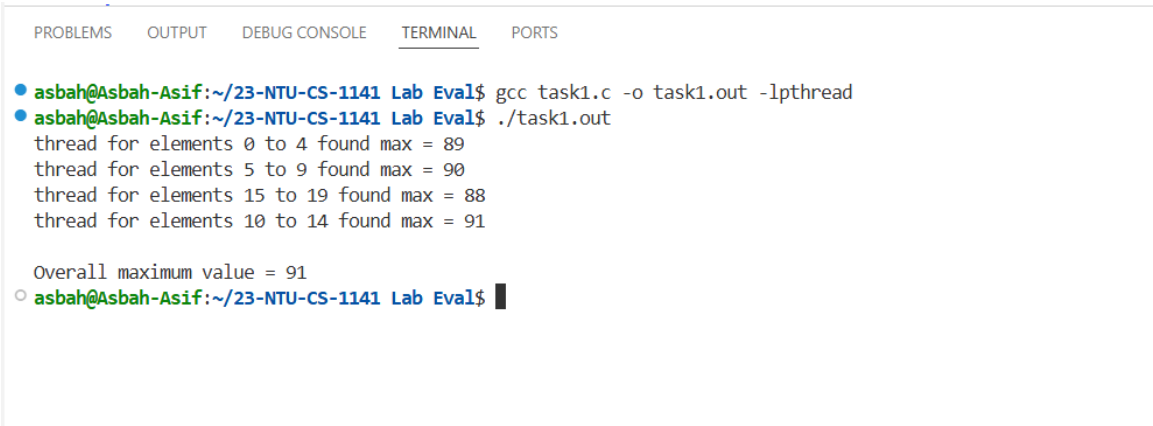
Code:

```
#include <stdio.h>
#include <pthread.h>
#include <stdlib.h>
int arr[20]={45, 23, 67, 89, 12, 34, 78, 90, 56, 21, 38, 72,


44, 91, 15, 83, 29, 66, 54, 88};
struct info{
  int start;
int end;
```

```
};

void* findMax(void* arg)
{
   struct info *data=(struct info*)arg;
   int max=arr[data->start];
   for(int i = data->start + 1; i <= data->end; i++) {
      if(arr[i] > max)
         max = arr[i];
   }
   printf("thread for elements %d to %d found max = %d\n", data->start, data->end,max );

   int *res=malloc(sizeof(int));
   *res=max;
   return res;
}

int main(){
   pthread_t t[4];
   struct info range[4];
   int part=5;

   for (int i = 0; i < 4; i++)
   {
      range[i].start= i*part;
      range[i].end= range[i].start+part-1;
```

```
        pthread_create(&t[i], NULL, findMax, &range[i]);


    }
    int finalMax=arr[0];
    for (int i=0; i<4;i++)
    {
        int *localMax;
        pthread_join(t[i], (void**)&localMax);
        if(*localMax>finalMax)
        finalMax=*localMax;
        free(localMax);
}
    printf("\nOverall maximum value = %d\n", finalMax);
    return 0;
}
```

Output:



I have to search Max value from the given array for this purpose I created 4 threads and assign each of them 5 elements, each thread separately find the max value in their given numbers and when all 4 threads find their max value a function will find max value from the 4 threads value.