

- ☐ Matrix application is highly parallel
- ☐ All of the above

4

Tick the correct statement about loop parallelization using simdization process of the given loop.

```
for (i=0; i<N; i++){  
    p=3*i+4; q=6*i+2; r=2*i*i+25;  
    X[p]=X[q]+r;  
}
```

(1 Point)

- ☐ Parallelization is definitely possible and there is no dependency between iteration
- ☐ Parallelization is may be possible and there may be not having dependency between iterations
- ☐ Parallelization is not possible and there is a dependency between iteration
- ☐ We cannot say

5

Given an application with a serial fraction value 0.1 and the rest of parallel fraction is divisible load. Calculate the maximum achievable speed up even if we are using infinite number of processor. (numeric answer)

(2 Points)

Enter your answer

6

Calculate total number of memory access in this code : a
memory access can be cache hit/miss

```
int sum, data[2000] *dest=&sum;
for (i= 0; i< 2000; i++) *dest += data[i];
```

(2 Points)

Enter your answer

7

Is this loop is beneficial to use GPU acceleration?

```
void VectorAvg(){
    for(int j=1;j<N-1;j++)
        A[j]=(B[j-1]+B[j]+B[j+1])/3.0;
}
```

(1 Point)

- ☐ Yes
- ☐ No
- ☐ Maybe
- ☐ may not be

8

Suppose you have a Royal Enfield Bullet bike and the bike have fuel consumption model $P=200+20*f^3$, where f is speed of bike between 0 to 1. You needs to go IITG-Panbazar 30km by road with in 1 hour of travel time. Assume the bike speed corresponds 0-1 mean 0KMPH-100KMPH. Your aim is to reach the destination within time deadline and minimize the fuel consumption.

(2 Points)

- ☐ Better to go at maximum 100KMPH speed and reach the destination early
- ☐ Better to go at the required speed 30KMPH
- ☐ Better to go at some other speed to reduce fuel consumption
- ☐ We cannot say.

9

Why Single precision Floating Point (SFP) number have accuracy issue when looking at bigger numbers?

(2 Points)

- ☐ Same 32 bits is used for both SFP representation and integer representation
- ☐ Integers are equally spaced, where as SFP numbers are not
- ☐ SFP can represent both smaller number upto 2^{-127} and bigger number upto 2^{127} .
- ☐ Because of all the above reasons

10

How can we simulate to multiprocessing on machine with one processor

(1 Point)

- ☐ It is not possible to simulate multiprocessing on a single processor
- ☐ It is possible using time division multiplexing, many process get time share the processor to simulate the multiprocessing
- ☐ It is possible to simulate at most two processes multiprocessing on single processor but no above 2 processes
- ☐ we cannot say

11

Suppose there are 10 identical processors and LPT rule is used to schedule the independent tasks with arbitrary execution without pre-emption to minimize C_{max} , the achievable approximation can be _____. (one word or numeric value)

(2 Points)

Enter your answer

12

Among these networks, which network has the highest bisection bandwidth
(1 Point)

- ☐ Tree
- ☐ 2D Torus
- ☐ Ring
- ☐ Star

13

Can a thread of process access stack area of other threads of the same process?

(1 Point)

- ☐ It is not possible as stack area of different threads are different
- ☐ It is possible as the whole process memory address is shared by all the threads
- ☐ We cannot say

14

Given a system of N nodes with hypercube interconnection network. The system has a diameter, the total number of links, and bisection bandwidth (2 Points)

- ☐ $2\sqrt{N}$, $4N$, \sqrt{N}
- ☐ $\log N$, $N\log N$, $N/2$
- ☐ \sqrt{N} , $4N\log N$, $\log N$
- ☐ $\log N$, $(N/2)\log N$, $N/2$

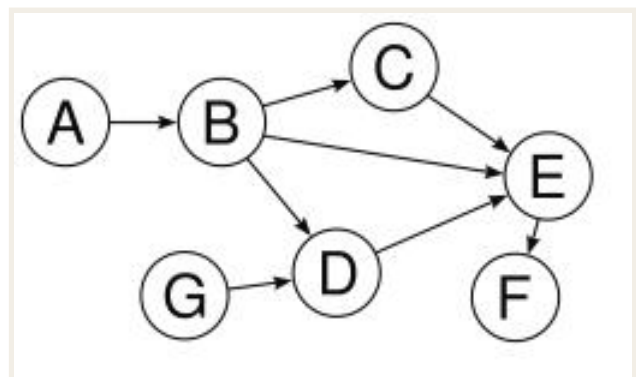
15

Given a cache of size 1MB with 4 way set associative and block (or line) size of 64B, calculate the number of bits required for the index field

(2 Points)

Enter your answer

16



Calculate Span of the following DAG, assume execution time of A, B, C, D, E, F, G as 1, 2, 3, 4, 5, 6, and 7.

Prec: A->B, B->C, B->D, B->E, G->D, C->E, D->E, E->F
(2 Points)

Enter your answer

17

Choose the best option about the dynamic and static construction of array in C++

(1 Point)

- ☐ Static creation of the array is always beneficial as it save time
- ☐ Always go for dynamic array creation of the array as it save space
- ☐ If the probability of requirement of the array is low create lazily otherwise construct statically.
- ☐ We cannot say.

18

Calculate the load factor, dilation, and congestion for the embedding of 16 nodes mesh onto 4 node mesh.

(1 Point)

- ☐ 4, 1, 2
- ☐ 4, 2, 1
- ☐ 4, 1, 1
- ☐ 2, 1, 2

19

Choose the right explanation of the problem $R | d_i, r_i, p_j | \sum U_j$
(2 Points)

- ☐ Minimizing the number of missed tasks for tasks with infinite deadlines, release time, arbitrary execution time, pre-emption allowed on unrelated processor
- ☐ Minimizing the number of missed tasks for tasks with deadlines, release time, arbitrary execution time and pre-emption not allowed on unrelated processors
- ☐ Minimizing the number of missed tasks for tasks with deadlines, online tasks, arbitrary execution time, pre-emption not allowed on uniform processors
- ☐ Minimizing number of missed tasks for tasks with deadlines, release time, arbitrary execution time, pre-emption allowed on uniform processors

20

Programming model for GPU: tick the wrong one
(2 Points)

- ☐ Threads get scheduled to SPs in phasewise and Thread-blocks get scheduled to SMs in phase wise
- ☐ Threads get mapped to SPs/CudaCore/StreamCores
- ☐ All the SPs and SMs share the load of threads and blocks equally pre-emptively
- ☐ Thread blocks gets scheduled to SMs.

21

Given P_{peak} and b_s values of a machine 10 GF/s and 12 GB/s respectively, what will be the achieved performance of the following loop in Giga flop per second. (assume write allocate)

```
float s, a[N], b[N];
for(i=0; i<N; i++) s=s+a[i]*b[i];
```

(2 Points)

Enter your answer

22

Given the following kernel, the best way to speed up this in Modern day processors of a single machine (PC/Laptop)

```
unsigned char x[N], w[N], k; //N is large  
for(i=0;i<N;i++) x[i]=(w[i]*x[i])-k;
```

(1 Point)

- ☐ OpenMP
- ☐ OpenMP + AVX
- ☐ MPI
- ☐ Pthread

23

Suppose you have a Hero Honda Spendour bike and the bike have fuel consumption model $P=5+50*f^3$, where f is speed of bike between 0 to 1. You need to go IITG-Panbazar 30km by road within one hour of travel time. Assume Hero Honda Spendour bike speed corresponds 0-1 mean 0KMPH-100KMPH. Your aim is reach the destination within deadline travel time and minimize the fuel consumption.

(2 Points)

- ☐ Better to go at maximum 100KMPH speed and reach the destination
- ☐ Better to go at the required speed 30KMPH
- ☐ Better to go at some other speed to reduce fuel consumption
- ☐ We cannot say.

24

Given a system of N nodes and our aim is to interconnect them, and our goal is to minimize the diameter. Which interconnection network is preferable

(1 Point)

- ☐ Star
- ☐ Hypercube
- ☐ Tree
- ☐ Clique/Complete Graph

25

What is the best possible optimization, we can think of the following code [hint: code don't take any external input]

```
int X=0, Y=0; N=1000;  
    for (i=1;i<=N;i++) X=X+sin(i%5);  
    for (i=1;i<=N;i++) Y=X+cos(i*i %5);  
    printf("X=%d, Y=%d",X,Y);
```

(2 Points)

- ☐ Merge both the for loop
- ☐ Use AVX and Simidization
- ☐ Use copy propagation and static calculation
- ☐ using LUTs for cos and sin computation

Submit

out your password.

Powered by Microsoft Forms | [Privacy and cookies](#) | [Terms of use](#)