

Sample Directi Placement Test Paper

1. What is the big-O time complexity of func(p)?

C++ code follows.

```
int get_power(int a, int b)
{
if(!b) return 1;
if(b%2) return a * get_power(a, b/2);
return get_power(a, b/2);
}

int func(int p)
{
int sum = 0;
for(int i = 1; i <= p; ++i) {
sum += get_power(i, 5);
}
return sum;
}
```

- a. $O(p \log 5)$
- b. $O(p \log p)$
- c. $O(\log p)$
- d. $O(p)$
- e. $O(p + \log p)$

2. Given a number N, generate a sequence S such that

$S[0] = N$

$S[i+1] = (3 * S[i] + 1) / 2$ if $S[i]$ is odd,

$= S[i] / 2$, if $S[i]$ is even,

till you reach 1.

For example for $N = 5$, the sequence is 5, 8, 4, 2, 1

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Given two numbers 20 and 35, generate the sequence S for A and B, and find the number where the two sequences meet.

- a.20
- b.30
- c.35
- d.40

3.Question 6: Multiple Answer

If at least two of the statements below are false, what is the probability that statement 2 is true?

- 1. A is true.
- 2. B is true.
- 3. A is false and B is true.

- a.0
- b.0.25
- c.0.5
- d.0.75
- e.1

4.What is the value of p, in main()? C code follows.

```
char* rev(char s[ ])
{
for(int i = 0, n = strlen(s); s[ i ]; ++i)
{
char c = s[ i ];
s[ i ] = s[ n-1-i ], s[ i ] = c;
}
return s;
```

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```
}  
int main()  
{  
char s[ ] = "uncommon ideas!";  
char *p = rev(s);  
}
```

- a. !saedi nommocnu
- b. ideas! uncommon
- c. uncommon ideas!
- d. nommocnu !saedi

5. Given 4 processes with their entering time and execution time as follows :

Process

Name

Entering

Time

Execution

Time

P1 2 10

P2 3 8

P3 6 4

P4 10 6

A CPU following the shortest job first algorithm (preemptive) is going to execute them.

A shortest job first algorithm will execute a process with the smallest CPU burst first, because it is preemptive, If a

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process is in execution and another process comes in with CPU burst being smaller than the remaining execution time of the currently executing process, then the new process will be allotted the CPU and the process currently executing will be sent to the waiting queue.

For the given processes above Calculate the average waiting time.

- a. 7.25
- b. 6.75
- c. 5.25
- d. 6.25
- e. None of the above

6. Given below is the post-order traversal of a binary search tree. Which of the following is its pre-order traversal?

(6, 5, 12, 13, 11, 15, 14, 20, 16, 10)

- a. 10, 5, 6, 16, 14, 11, 13, 12, 15, 20
- b. 10, 5, 6, 15, 14, 13, 11, 12, 16, 20
- c. 10, 5, 6, 14, 13, 11, 12, 16, 15, 20
- d. 10, 5, 6, 16, 13, 11, 12, 14, 15, 20

```
v\:* {behavior:url(#default#VML);} o\:* {behavior:url(#default#VML);} w\:* {behavior:url(#default#VML);} .shape {behavior:url(#default#VML);}
```

7. Insert the numbers in the sequence "8, 5, 1, 4, 2, 10, 12, 7, 3" into a min-heap. The order of insertion is as given. The insertion happens as described here.

If the root is said to be at level 1, the root's children at level 2, and so on, what is the level in which 8 occurs in the heap?

- a. 1

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- b. 2
- c. 3
- d. 4
- e. 5

8.

You are given a wall that is 50m wide and a rope that is 20m in length. Place the two ends of the rope on the wall and form a figure such that the enclosed area between the wall and the rope is maximized. What is this area?

- a. 63.63
- b. 127
- c. 50
- d. 127.26

9. Two players are playing a game on a checker board (see image below). There is a queen at (i,j) and it can only move such that either "i" or "j" or both decrease (by any amount), that is, it can move only left, or down, or diagonally left-down. The players take turns moving the queen, and the player who first reaches origin wins. Which (i,j) values will result in a win for the first player, among the following? Assume that both players play optimally.

You cannot leave the board.

Optimal Play: A player is said to make an "optimal move" if he has considered all his moves, and all the opponent's and his subsequent moves till one of them wins. An optimal player chooses his current move assuming that the opponent will force him into a losing position, if he can.

Example: If the queen is initially at $(2,1)$, your possible moves are to $(1,1)$, $(0,1)$, $(2,0)$ or $(1,0)$. Every one of these moves will make the opponent make his next move to $(0,0)$ and hence $(2,1)$ is a losing position for the first player.

The following image shows a checkerboard with the cell $(2,3)$ marked in red.

- a. 4,5
- b. 5,3
- c. 2,3
- d. 3,4
- e. 3,5