Department of Computer Science

Admission Test for PhD Program
July 2013

Part I

Time : 30 min Max Marks: 15

Each Q carries 1 marks. ¼ mark will be deducted for every wrong answer. Part II of only those candidates will be evaluated who will score at least 6 marks (40%) in Part I.

1.Consider a weighted undirected graph with positive edge weights and let (u, v) be an edge in the graph. Given that a shortest path from source vertex s to u has weight 25 and a shortest path from s to v has weight 39. Which statement is always true?

1) Weight (u, v) < 14
2) Weight (u, v) = 14
3) Weight (u, v) $\geq$ 14
4) Weight (u, v) > 14

2. Consider the following program fragment

```
char c;
 for(c = 'a'; c <= 'j'; c--)
{
c++;
putchar(xx);
c++;
}
```

If the required output is "abcdefghij" then xx should be

1) c
2) c+1
3) c-1
4) c-2

3. Following is a recursive function for computing the sum of integers from 0 to n

```
int  sum(int n)
{
    if n == 0 then sum = 0
    else
        ---
    return sum;
```

}

The missing statement in the else part is

1) return sum(n);
2) sum := n + sum(n-1);
3) return sum(n-1);
4) sum := n-1 + sum(n-1);

4. In sorting an array using merge sort, number of times merge is performed is:

1) theta(n log n)
2) theta(1)
3) theta(log n)
4) theta(n)

5. What is the maximum and the minimum possible depth of a binary search tree after inserting n elements?

1) n/2 and log n respectively.
2) log n and log n respectively.
3) n and n respectively.
4) n and log n respectively.

6. What will be the output of the following C program segment?

```
char inChar = 'A' ;
switch ( inChar ) {
case 'A' : printf ("Choice A") ;
case 'B' :
case 'C' : printf ("Choice B") ;
case 'D' :
case 'E' :
default : printf ( " No Choice" ) ; }
```

1) A
2) AB
3) No Choice
4) ABNo Choice

7. The following postfix expression is evaluated using a stack

123-*23+ + 42* –

The top two elements of the stack after the second * is evaluated are

1) 6, 4
2) 6, 6
3) 8, 6
4) 8, 4

8. If an instruction takes 'i' microseconds and a page fault takes an additional 'p' microseconds. If page fault occurs after every 'f' instructions on an average, the effective instruction time, is

1) (i + p)/f
2) i + p/f
3) i + p * f
4) (i + p) * f

9. A cache is effective for

1) sequential access of an array
2) sequential access of a linked list
3) LVR access of a tree
4) both (a) and (b) above

10. Which scheduling scheme is suitable when (i) all the submitted jobs are small and (ii) submitted jobs are a mix of small, medium and large jobs?

1) (i) Round-robin and (ii) FCFS
2) (i) FCFS and (ii) Round-robin
3) (i) FCFS and (ii) Shortest job first
4) (i) Shortest job first and (ii) FCFS

11. In a railway network, a railway track is an example of

1) Simplex
2) Half-Duplex
3) Full- Duplex
4) All of these

12. Start and stop bits are used in serial communication for

1) Error detection
2) Error correction
3) Synchronization
4) Slowing down the communication

13. If you establish a TCP connection from src to dst passing through multiple IP routers, then which of the following statements is true?

1) all packets will follow the same path from src to dst.
2) packets may follow different paths, but will be put in order by the TCP at dst.
3) src will specify the route to be followed by all the packets using source routing.
4) both (a) and (c)

14. Representation of -1 in 2's complement notation in n bits is

1) 1 followed by n- 2 zeroes followed by 1.
2) all 1s.
3) n-1 1s followed by a zero.
4) Can't be generalized.

15. If the size of the virtual address space is same as that of physical address space and we do not wish to use the virtual memory, which one of the following will be true ?

1) Hardware support required will be more and it will support large scale multiprogramming.
2) Hardware support required will be more and it will support only small scale multiprogramming.
3) Hardware support required will be less and it will support large scale multiprogramming.
4) Hardware support required will be less and it will support only small scale multiprogramming.