Coding with Solution to some questions

1. How to swap two variables without using third variable and bitwise operator?

```
a=a^b;
b=b^a;
a=a^b;
```

Line	Operation	Value of a	Value of b	
1	-	5	10	Initial values
2	a=a^b	15	10	
3	b=a^a	15	5	
4	a=a^b	10	5	values after swapping

/* one line statement using bit-wise operators */
a^=b^=a^=b;
The order of evaluation is from right to left. This is same as in approach (bitwise X-OR) but the three statements are compounded into one statement.
/* one line statement using arithmetic & assignment operators */
a=(a+b) - (b=a);
In the above axample, parenthesis operator enjoys the highest priority & the order of evaluation is from left to right. Hence (a+b) is evaluated first and replaced with 15. Then (b=a) is evaluated and the value of a is assigned to b, which is 5. Finally a is replaced with 15-5, i.e. 10. Now the two numbers are swapped.

2. How to swap between first and second byte of an integer in one line statement?
Answer:

```
int x=0x1234;
x = x<<8 | x>>8;
```

Explanation:
Let x = 0x1234

```
x              = 00010010   00110100
x<<8           = 00110100   00000000
x >>8          = 00000000   00010010
x<<8|x>>8  = 00110100   00010010  i.e. value of 'x' after swap is 0x3412
```

3. What is the efficient way to divide a number by 4?

```
x = x>>2;
```

4. How to generate Fibonacci sequence using pointer?

```
#include<stdio.h>
 #include<stdlib.h>
int main() {
```

```
        int i,n;
        printf("enter the value");
        scanf("%d",&n);
        int *fib;
        fib=(int*)malloc(n*sizeof(int));
         *(fib+0)=0;                                    //fib[0]=0;
        *(fib+1)=1;                                     //fib[1]=1;
        for(i=2;i<n;i++)
                *(fib+i)=*(fib+(i-1))+*(fib+(i-2));      //fib[i]=fib[i-1]+fib[i-2];
        for(i=0;i<n;i++)
                printf("%3d",*(fib+i));                 //printf("%d\n",fib[i]);
        return 0;
}
```

5. How can you check whether a number is power of 2 or not?

```
void main (){
        int n;
        printf ("\n Enter any no:");
        scanf ("%d", & n);  // for power of 2 no . only one bit of the no. can be '1' & rest are must be '0'.
        if (n && ((n & n-1) = = 0)) // if n!=0
                printf ("It is power of 2");
        else
                printf ("It is not power of 2");
}
```

6. How to print "Hello" without using semicolon

```
void main(){
        if(printf("Hello ")){
        }
}
```

7. How to find the missing number in given integer array of 1 to 100?
8. How to find the duplicate number on a given integer array?
9. How to find the largest and smallest number in an unsorted integer array?
10. Find the maximum & minimum of two numbers in a single line without using any condition & loop.

Answer:

```
void main (){
        int a=15, b=10;
        printf (" max = %d, min = %d", ((a+b) + abs(a-b)) /2, ((a+b) – abs (a-b)) /2);
}
```

11. How to find all pairs of integer array whose sum is equal to a given number?
12. How to find duplicate numbers in an array if it contains multiple duplicates?
13. How to remove duplicates from given array in Java?
14. How to print number from 1 to 100 without using conditional operators.

Answer:

```
void main (){
        int  i=0;
        while (100 - i++){
                printf (" %d", i);

        }
}
```

15. WAP to print 100 times “AOT” without using loop & goto statement.

Answer:

```
int  main(){
        show (5);
}
show (int x){
        if (x==0) return;
        printf (" AOT\n");
        show (x-1);
}
```

16. Program to add two numbers without using arithmetic operator

```
int  main(){
        int a=3,b=5;
        while(b--)
                a++;
        printf(“result=%d”, a);
}
```

17. How to remove duplicates from an array in place?

18. How to reverse an array in place in Java?

19. How to find multiple missing numbers in given integer array with duplicates?

20. How to find middle element of a singly linked list in one pass?

```
second=first=head; //initially fast and slow points to the first node
count=1;
while (first!= NULL) {
         first = first->next;     //move first pointer in each iteration
        count++;
        if (count%2!=0) {
                second = second->next; //move second  when count value is odd
         }
 }
```

21. How to check if a given linked list contains cycle?

```
second=first=head; //initially fast and slow points to the first node
while (first!= NULL && first->next!=NULL) {
         first = first->next->next;     //move first pointer in each iteration
        second=second->next;
        if (first==second) break;   //cycle found
```

```
}
```

22. How to reverse a linked list?
23. How can you sort the element of a linked list?

```
void sort(){
        NODE *q=NULL,*last=NULL,*y,*r;
        int t,flag;
        for(last=NULL;last!=start;last=q)      {
                flag=0;
                for(q=start;q->next!=last;){
                        r=q->next;
                        if(q->data > r->data){
                                if(q==start) start=r;
                                q->next=r->next;
                                r->next=q;
                                y->next=r;

                        }
                        else{
                                q=q->next;
                        }
                        y=y->next;
                }
        }
}
```

24. How can print linked list in reverse order without actually reversing the list?

```
void print (struct node* head) {
         if (head == NULL)  return;
         print (head->next);
         printf("%d  ", head->data);
}
```

25. How to reverse a singly linked list without recursion?
26. How to remove duplicate nodes in an unsorted linked list?
27. How to find the length of a singly linked list?
28. How to find the nth (2^{nd}, 3^{rd}, …) node from the end in a singly linked list?

```
second=first=head; //initially fast and slow points to the first node
while (first!= NULL) {
         first = first->next;     //move first pointer to nth node
        start++;
        if (start > n) {          //after first reaching nth node first and second move simultaneously
                second = second->next;
         }
}
```

29. How to print duplicate characters from String?
30. How to check if two Strings are anagrams of each other?

31. How to print first non repeated character from String?
32. How to reverse a given String using recursion?
33. How to check if a String contains only digits? (For CSE, IT only)
(for CSE and IT students see regular expression in java)
34. How to find duplicate characters in a String?
35. How to count a number of vowels and consonants in a given String?
36. How to count the occurrence of a given character in String?
37. How to reverse words in a given sentence without using any library method?
38. How to check if two String is a rotation of each other?
S1=”1234”; s2=”4123”;
1) check length of two strings, if length is not same then return false //strlen(s1)=strlen(s2)
2) concatenate given string to itself //s1=”12341234”
3) check if s2 is a substring of concatenated version of s1. //here 4123 is substring of s1 ”12341234”

39. How to check if given String is Palindrome?
40. There are two programs, PrintA.java and PrintB.java. Write some code so that these programs can send messages to each other.

PrintA.java

```
public class PrintA{

	public static void main(String args[]){

		PrintB b=new PrintB();

		b.message("Hello from PrintA");

	}

	public void message(String s){

		System.out.print(s);

	}

}
```

PrintB.java

```
public class PrintB{

	public static void main(String args[]){

		PrintA a=new PrintA();

		a.message("Hello from PrintB");
```

```
    }
    public void message(String s){
        System.out.print(s);
    }
}
```