Shell Script Programs

Q1) Fibonacci Series (First n Terms)

```
read -p "Enter number of terms: " n
a=0
b=1
echo "Fibonacci Series:"
for (( i=0; i<n; i++ ))
do
    echo -n "$a "
    fn=$((a + b))
    a=$b
    b=$fn
done
echo
```

Sample Output:

```
First 10 Fibonacci numbers:
0 1 1 2 3 5 8 13 21 34
```

Q2) Factorial of a Number

```
read -p "Enter a number: " n
fact=1
i=1
while [ $i -le $n ]; do
    fact=$((fact * i))
    i=$((i + 1))
done
echo "Factorial of $n is $fact"
```

Q3) Multiples of 3 Between 1 and 50

```
read -p "Enter a number: " n
echo "Multiples of $n up to 50:"
for ((i=n; i<=50; i+=n))
do
    echo -n "$i  "
done
echo
```

Sample Output (n=3):

```
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48
```

Q4) Print Multiplication Table Using For Loop

```
read -p "Enter a number: " n
echo "Multiplication Table for $n:"
for ((i=1; i<=10; i++)); do
    echo "$n x $i = $((n * i))"
done
```

Sample Output:

```
Enter a number: 2
Multiplication Table for 2:
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
...
2 x 10 = 20
```

Q5) Diamond Pattern of Stars

```
rows=5

# Upper half of diamond
for ((i=1; i<=rows; i++))
do
    for ((j=i; j<rows; j++))
    do
        echo -n " "
    done
    for ((k=1; k<=((2*i - 1)); k++))
    do
```

```
        echo -n "*"
    done
    echo
done

# Lower half of diamond
for ((i=rows-1; i>=1; i--))
do
    for ((j=rows; j>i; j--))
    do
        echo -n " "
    done
    for ((k=1; k<=((2*i - 1)); k++))
    do
        echo -n "*"
    done
    echo
done
```

Sample Output:

```
     *
    ***
   *****
  *******
*********
  *******
   *****
    ***
     *
```
