

PROGRAM :**4-POINT DIF-FFT/IFFT :**

```

close();
clear();
x=input('Enter the input Sequence:');
N=length(x);
for n=1:N/2
    f(n)=x(n)+x(n+N/2);
    g(n)=[x(n)-x(n+N/2)]*exp((-1*2*pi*i*(n-1))/N);
end
X(1)=f(1)+f(2);
X(3)=f(1)-f(2);
X(2)=g(1)+g(2);
X(4)=g(1)-g(2);
disp(x);
subplot(2,2,1);
stem(x);
xlabel('n');
ylabel('x(n)');
title('sequence');
disp(X);
subplot(2,2,2);
stem(real(X));
xlabel('n');
ylabel('X(n)');
title('real sequence');
disp(X);
subplot(2,2,3);
stem(imag(X));
xlabel('n');
ylabel('X(n)');
title('imaginary sequence');

for k=1:N/2
    F(k)=X(k)+X(k+N/2);
    G(k)=(X(k)-X(k+N/2))*exp((2*pi*i*(k-1))/N);
end
x(1)=(F(1)+F(2))/N;
x(2)=(G(1)+G(2))/N;
x(3)=(F(1)-F(2))/N;
x(4)=(G(1)-G(2))/N;
disp(x);
subplot(2,2,4);
stem(x);
xlabel('n');

```

```
ylabel('x(n)');
title('idft sequence');
```

8-POINT DIF-FFT/IFFT :

```
close();
clear();
x=input('Enter the input Sequence:');
N=length(x);

for n=1:N/2
    f(n)=x(n)+x(n+N/2);
    g(n)=(x(n)-x(n+N/2))*exp((-1*2*pi*i*(n-1))/N);
end
for n=1:N/4
    a(n)=f(n)+f(n+N/4);
    b(n)=(f(n)-f(n+N/4))*exp((-1*2*pi*i*(n-1)*2)/N);
    c(n)=g(n)+g(n+N/4);
    d(n)=(g(n)-g(n+N/4))*exp((-1*2*pi*i*(n-1)*2)/N);
end
X(1)=a(1)+a(2);
X(5)=a(1)-a(2);
X(3)=b(1)+b(2);
X(7)=b(1)-b(2);
X(2)=c(1)+c(2);
X(6)=c(1)-c(2);
X(4)=d(1)+d(2);
X(8)=d(1)-d(2);
disp(x);
subplot(2,2,1);
stem(x);
xlabel('n');
ylabel('x(n)');
title('sequence');
disp(X);
subplot(2,2,2);
stem(real(X));
xlabel('n');
ylabel('X(n)');
title('real sequence');

subplot(2,2,3);
stem(imag(X));
xlabel('n');
ylabel('X(n)');
title('imaginary sequence');

for k=1:N/2
```

```

F(k)=X(k)+X(k+N/2);
G(k)=(X(k)-X(k+N/2))*exp((2*pi*i*(k-1))/N);
end
for k=1:N/4
    A(k)=F(k)+F(k+N/4);
    B(k)=F(k)-F(k+N/4)*exp((2*pi*i*(k-1)*2)/N);
    C(k)=G(k)+G(k+N/4);
    D(k)=G(k)-G(k+N/4)*exp((2*pi*i*(k-1)*2)/N);
end
x(1)=(A(1)+A(2))/N;
x(5)=(A(1)-A(2))/N;
x(3)=(B(1)+B(2))/N;
x(7)=(B(1)-B(2))/N;
x(2)=(C(1)+C(2))/N;
x(6)=(C(1)-C(2))/N;
x(4)=(D(1)+D(2))/N;
x(8)=(D(1)-D(2))/N;
disp(x);
subplot(2,2,4);
stem(x);
xlabel('n');
ylabel('x(n)');
title('idft sequence');

```

OUTPUT :

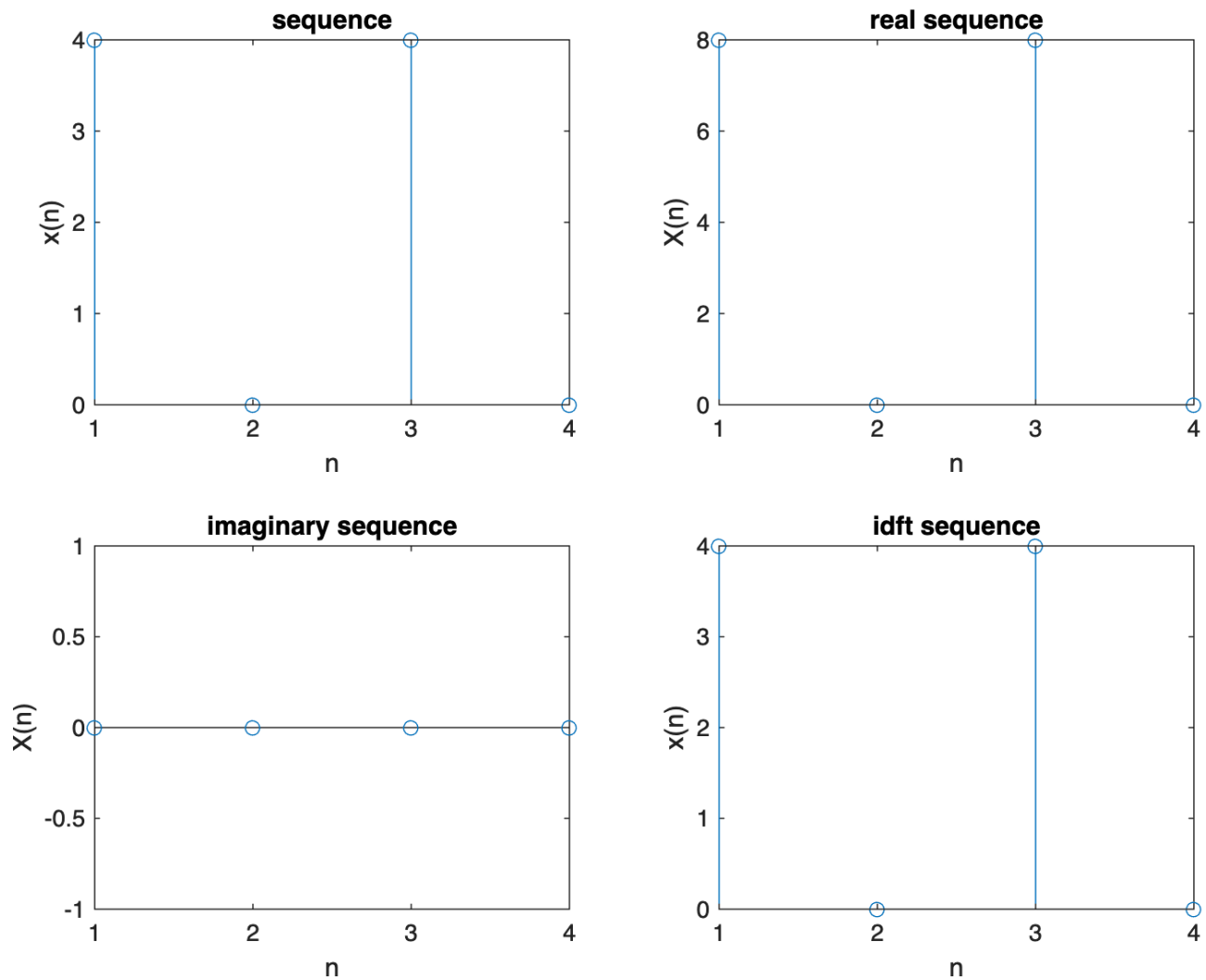
4-POINT DIF-FFT/IFFT :

```

>> DSPEXP7_1
Enter the input Sequence:
[4,0,4,0]

```

4	0	4	0
8	0	8	0
8	0	8	0
4	0	4	0



OUTPUT :

8-POINT DIF-FFT/IFFT :

```
>> DSPEXP7_2
```

Enter the input Sequence:

```
[1,0,1,0,1,0,1,0]
```

```
1      0      1      0      1      0      1      0
```

```
4      0      0      0      4      0      0      0
```

```
1      0      1      0      1      0      1      0
```

