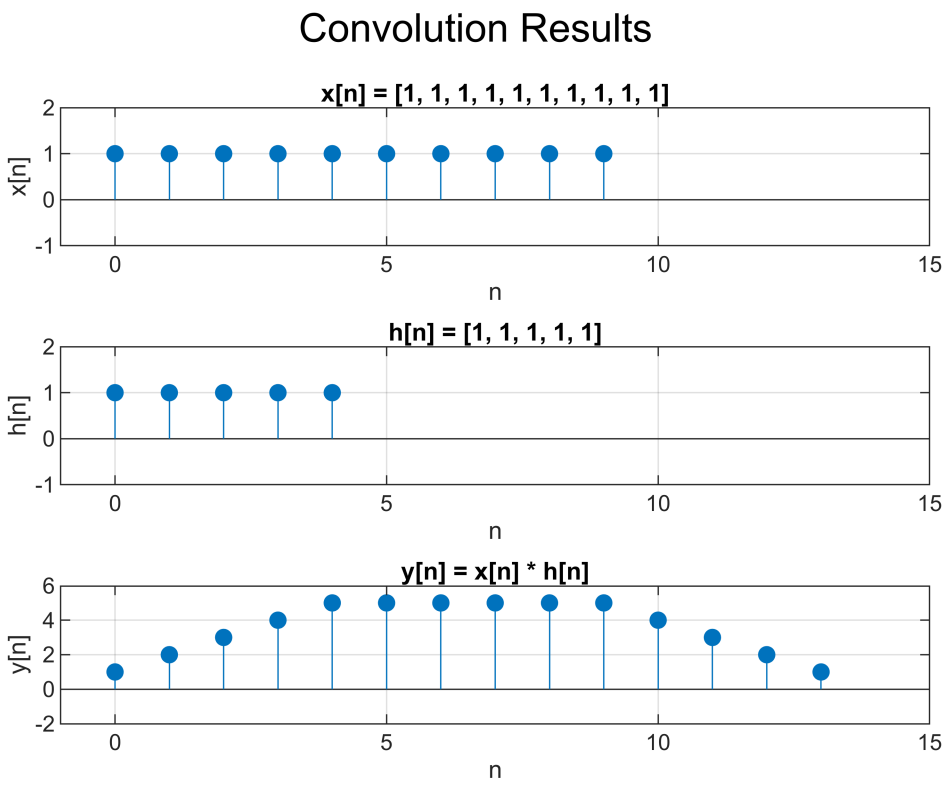
PART 1

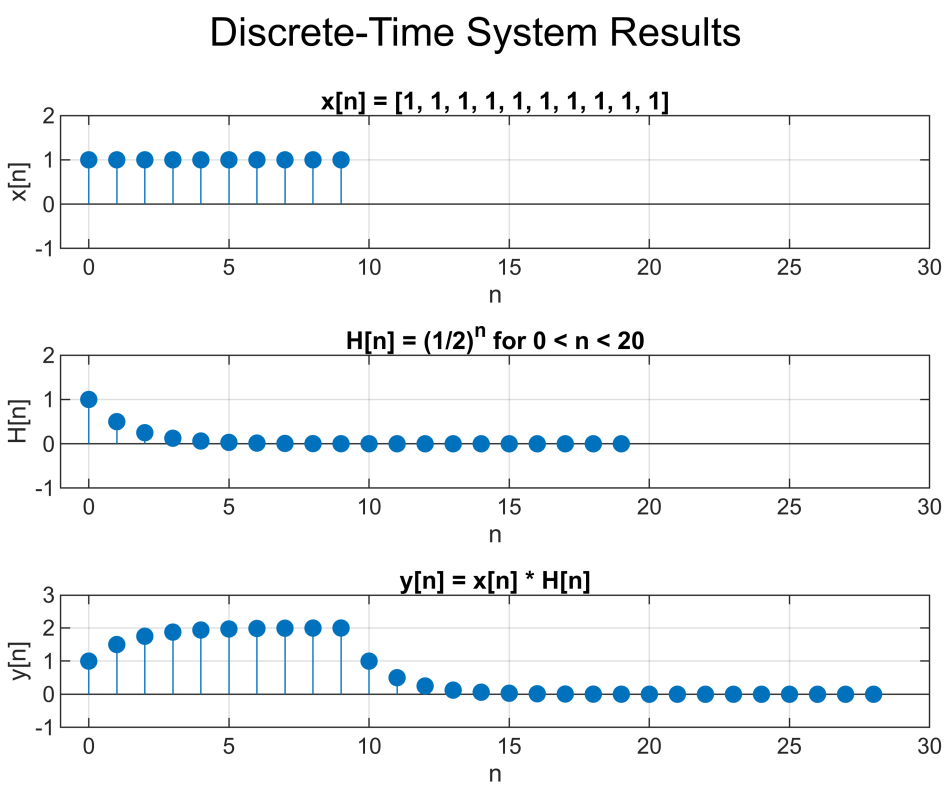
```
x = ones(1, 10);
h = ones(1, 5);
y = conv(x, h);
n_x = 0:length(x)-1;
n_h = 0:length(h)-1;
n_y = 0:length(y)-1;

figure;

subplot(3, 1, 1);
stem(n_x, x, 'filled');
title('x[n] = [1, 1, 1, 1, 1, 1, 1, 1, 1, 1]');
xlabel('n');
ylabel('x[n]');
xlim([-1 15]);
ylim([-1 2]);
grid on;

subplot(3, 1, 2);
stem(n_h, h, 'filled');
title('h[n] = [1, 1, 1, 1, 1]');
xlabel('n');
ylabel('h[n]');
xlim([-1 15]);
ylim([-1 2]);
grid on;

subplot(3, 1, 3);
stem(n_y, y, 'filled');
title('y[n] = x[n] * h[n]');
xlabel('n');
ylabel('y[n]');
xlim([-1 15]);
ylim([-2 6]);
grid on;

sgtitle('Convolution Results');
```



PART 2

```
x = ones(1, 10);
n_H = 0:19;
H = (1/2).^n_H;
y = conv(x, H);
n_x = 0:length(x)-1;
n_H = 0:length(H)-1;
n_y = 0:length(y)-1;

figure;

subplot(3, 1, 1);
stem(n_x, x, 'filled');
title('x[n] = [1, 1, 1, 1, 1, 1, 1, 1, 1, 1]');
xlabel('n');
ylabel('x[n]');
xlim([-1 30]);
ylim([-1 2]);
grid on;

subplot(3, 1, 2);
stem(n_H, H, 'filled');
title('H[n] = (1/2)^n for 0 < n < 20');
xlabel('n');
ylabel('H[n]');
```

```
xlim([-1 30]);
ylim([-1 2]);
grid on;

subplot(3, 1, 3);
stem(n_y, y, 'filled');
title('y[n] = x[n] * H[n]');
xlabel('n');
ylabel('y[n]');
xlim([-1 30]);
ylim([-1 3]);
grid on;

sgtitle('Discrete-Time System Results');
```



PART 3

```
n = 0:19;
H = (1/3).^n;
X = cos(2*pi/5*n);
y = conv(X, H);
n_X = 0:length(X)-1;
n_H = 0:length(H)-1;
n_y = 0:length(y)-1;

figure;
```

```
subplot(3, 1, 1);
stem(n_X, X, 'filled');
title('X[n] = cos(2\pi/5 * n)');
xlabel('n');
ylabel('X[n]');
xlim([-1 40]);
ylim([-2 2]);
grid on;

subplot(3, 1, 2);
stem(n_H, H, 'filled');
title('H[n] = (1/3)^n for 0 < n < 20');
xlabel('n');
ylabel('H[n]');
xlim([-1 40]);
ylim([-1 2]);
grid on;

subplot(3, 1, 3);
stem(n_y, y, 'filled');
title('y[n] = X[n] * H[n]');
xlabel('n');
ylabel('y[n]');
xlim([-1 40]);
ylim([-2 2]);
grid on;

sgtitle('Discrete-Time System Results');
```

Discrete-Time System Results