

Homework Examples

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Example-1.6:

S=1:6

```
S = 1×6
    1     2     3     4     5     6
```

E1=S(S>=4)

```
E1 = 1×3
    4     5     6
```

E2=S(mod(S, 2)==0)

```
E2 = 1×3
    2     4     6
```

E3=S(mod(sqrt(S), 1)==0)

```
E3 = 1×2
    1     4
```

Example-1.8:

```
N=8;
bit=zeros(N,3);
for i=0:N-1
    bits(i+1, :)=[floor(i/4), mod(floor(i/2),2), mod(i,2)];
end
letters=['r', 'g'];
S=letters(bits + 1)
```

```
S = 8×3 char array
    'rrr'
    'rrg'
    'ngr'
    'rgg'
    'grr'
    'grg'
    'ggr'
    'ggg'
```

R1=S(S(:,1)=='r', :)

```
R1 = 4×3 char array
    'rrr'
    'rrg'
    'ngr'
    'rgg'
```

G1=S(S(:,1)=='g', :);

```
R2=S(S(:,2)=='r', :)
```

```
R2 = 4x3 char array  
'rrr'  
'rng'  
'grr'  
'grg'
```

```
G2=S(S(:,2)=='g', :)
```

```
G2 = 4x3 char array  
'ngr'  
'rgg'  
'ggr'  
'ggg'
```

```
R3=S(S(:,3)=='r', :)
```

```
R3 = 4x3 char array  
'rrr'  
'ngr'  
'grr'  
'ggr'
```

```
G3=S(S(:,3)=='g', :);
```

```
E=S((S(:,1)=='r') & (S(:,2)=='g') & (S(:,3)=='r'), :);
```

```
fprintf('R1 \n G2 \n R3 = { ''%s'' }\n', E);
```

```
R1 \n G2 \n R3 = { 'ngr' }
```

Example-1.10:

```
symb=[ 'h', 't'];  
out=dec2bin(0:15) - '0';  
coin_flips=symb(out + 1)
```

```
coin_flips = 16x4 char array  
'hhhh'  
'hhht'  
'hhth'  
'hhtt'  
'hthh'  
'htht'  
'htth'  
'httt'  
'thhh'  
'thht'  
'thth'  
'thtt'  
'tthh'  
'ttht'  
'tthh'  
'ttht'  
'ttth'  
'tttt'
```

```
B=cell(1,5);  
for i=1:size(coin_flips, 1)  
    out1=coin_flips(i, :);  
    num_heads=sum(out1=='h');  
    B{num_heads+1}=[B{num_heads+1};out1];
```

```

end
for i=0:4
    fprintf('B%d (Outcomes with %d heads):\n', i, i);
    disp(B{i+1})
end

B0 (Outcomes with 0 heads):
tttt
B1 (Outcomes with 1 heads):
httt
thtt
ttht
ttth
B2 (Outcomes with 2 heads):
hhtt
htht
htth
thht
thth
tthh
B3 (Outcomes with 3 heads):
hhht
hhth
hthh
thhh
B4 (Outcomes with 4 heads):
hhhh

```

Example 1.11:

```
A=[B{1}; B{2}; B{3}]
```

```

A = 11x4 char array
'tttt'
'httt'
'thtt'
'ttht'
'ttth'
'hhtt'
'htht'
'htth'
'thht'
'thth'
'tthh'
```

Example-1.13:

```

S=1:6;
E1=S(S>=4);
E2=S(mod(S,2)==0);
E3=S(mod(sqrt(S), 1)==0);
num_outcomes = length(S);
P_E1=length(E1)/num_outcomes;
P_E2=length(E2)/num_outcomes;
P_E3=length(E3)/num_outcomes;
fprintf('P(Roll 4 or higher) = %.2f\n', P_E1);
```

```
P(Roll 4 or higher) = 0.50
```

```
fprintf('P(Roll an even number) = %.2f\n', P_E2);
```

```
P(Roll an even number) = 0.50
```

```
fprintf('P(Roll the square of an integer) = %.2f\n', P_E3);
```

```
P(Roll the square of an integer) = 0.33
```

Example-1.14:

```
S=['lv'; 'ld'; 'lf'; 'bv'; 'bd'; 'bf']
```

```
S = 6x2 char array  
'lv'  
'ld'  
'lf'  
'bv'  
'bd'  
'bf'
```

```
P=[0.30, 0.12, 0.15, 0.20, 0.08, 0.15]
```

```
P = 1x6  
0.3000 0.1200 0.1500 0.2000 0.0800 0.1500
```

```
P_Long=sum(P(S(:,1)=='l'));  
P_Brief=1-P_Long;  
P_Voice=sum(P(S(:,2)=='v'));  
P_Data=sum(P(S(:,2)=='d'));  
P_Fax=sum(P(S(:,2)=='f'));  
P_t_given_Long=P(S(:,1)=='l')/P_Long;  
P_t_given_Brief=P(S(:,1)=='b')/P_Brief;  
fprintf('P(Long)=%.2f, P(Brief)=%.2f\n', P_Long, P_Brief);
```

```
P(Long)=0.57, P(Brief)=0.43
```

```
fprintf('P(Voice)=%.2f, P(Data)=%.2f, P(Fax)=%.2f\n', P_Voice, P_Data, P_Fax);
```

```
P(Voice)=0.50, P(Data)=0.20, P(Fax)=0.30
```

```
fprintf('P(Voice|Long)=%.3f, P(Data|Long)=%.3f, P(Fax|Long)=%.3f\n',  
P_t_given_Long);
```

```
P(Voice|Long)=0.526, P(Data|Long)=0.211, P(Fax|Long)=0.263
```

```
fprintf('P(Voice|Brief)=%.3f, P(Data|Brief)=%.3f, P(Fax|Brief)=%.3f\n',  
P_t_given_Brief);
```

```
P(Voice|Brief)=0.465, P(Data|Brief)=0.186, P(Fax|Brief)=0.349
```

Example-1.15:

```
S=['nr'; 'ra'; 'ar'; 'aa']
```

```
S = 4x2 char array
  'rr'
  'ra'
  'ar'
  'aa'
```

```
A1=S(:,2)=='r';
B1=S(:,1)=='r';
A=S(A1,:)
```

```
A = 2x2 char array
  'rr'
  'ar'
```

```
B=S(B1,:)
```

```
B = 2x2 char array
  'rr'
  'ra'
```

```
C=A1 & B1;
A_and_B=S(C,:)
```

```
A_and_B =
  'rr'
```

```
n=length(S)
```

```
n = 4
```

```
P_A_and_B=sum(C)/n
```

```
P_A_and_B = 0.2500
```

```
P_B=sum(B1)/n
```

```
P_B = 0.5000
```

```
P_A_given_B=P_A_and_B/P_B;
fprintf('P(A|B) = %.2f\n', P_A_given_B);
```

```
P(A|B) = 0.50
```