

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'  
    'rgr'  
    'rgg'  
    'grr'  
    'grg'  
    'ggr'  
    'ggg'
```

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

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

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

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

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

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

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

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

```
R3 = 4x3 char array  
'rrr'  
'rgr'  
'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 = { 'rgr' }
```

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'  
'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);

```

$P(\text{Roll } 4 \text{ or higher}) = 0.50$

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

$P(\text{Roll an even number}) = 0.50$

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

$P(\text{Roll the square of an integer}) = 0.33$

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);
```

$P(\text{Long})=0.57, P(\text{Brief})=0.43$

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

$P(\text{Voice})=0.50, P(\text{Data})=0.20, P(\text{Fax})=0.30$

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

$P(\text{Voice}|\text{Long})=0.526, P(\text{Data}|\text{Long})=0.211, P(\text{Fax}|\text{Long})=0.263$

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

$P(\text{Voice}|\text{Brief})=0.465, P(\text{Data}|\text{Brief})=0.186, P(\text{Fax}|\text{Brief})=0.349$

Example-1.15:

```
S=['rr'; '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
```