Problem 1

Make random integers - Dice function

In [1]:

```python
import numpy as np

def Dice(N):
    num = []

    for _ in range(N):
        num.append(np.random.randint(1, 7))

    return num
```

In [50]:

```python
result = [] # Dice 결과 저장

for _ in range(10, 100+10, 10): # 10~100까지 10 증가해서 결과 저장
    result.append(Dice(_))

cnt = []

for i in range(0, 10, 1): # Dice 개수(10개+)마다 1~6 경우의 개수 각각 저장
    tmp = [0, 0, 0, 0, 0, 0]
    for j in range(0, len(result[i]), 1):
        for k in range(1, 7, 1):
            if result[i][j] == k:
                tmp[k-1] += 1
    cnt.append([(i+1)*10, tmp])

print(cnt)
print(cnt[0][1])

freq = [] # 주사위 던지는 횟수에 따른 1~6 빈도수를 저장할 배열

for i in range(0, 10, 1):
    tmp = []
    for j in cnt[i][1]:
        tmp.append(round(j/((i+1)*10),3))
    freq.append([(i+1)*10, tmp])

print(freq)
```

```
[[10, [2, 0, 1, 3, 4, 0]], [20, [5, 5, 2, 2, 5, 1]], [30, [5, 1, 11, 4, 4, 5]], [40, [8, 9, 7, 6,
8, 2]], [50, [13, 5, 8, 3, 8, 13]], [60, [5, 11, 13, 8, 14, 9]], [70, [11, 13, 12, 14, 11, 9]], [8
0, [13, 13, 17, 17, 10, 10]], [90, [15, 19, 16, 18, 15, 7]], [100, [17, 17, 12, 21, 19, 14]]]
[2, 0, 1, 3, 4, 0]
[[10, [0.2, 0.0, 0.1, 0.3, 0.4, 0.0]], [20, [0.25, 0.25, 0.1, 0.1, 0.25, 0.05]], [30, [0.167,
0.033, 0.367, 0.133, 0.133, 0.167]], [40, [0.2, 0.225, 0.175, 0.15, 0.2, 0.05]], [50, [0.26, 0.1,
0.16, 0.06, 0.16, 0.26]], [60, [0.083, 0.183, 0.217, 0.133, 0.233, 0.15]], [70, [0.157, 0.186, 0.1
71, 0.2, 0.157, 0.129]], [80, [0.163, 0.163, 0.212, 0.212, 0.125, 0.125]], [90, [0.167, 0.211, 0.1
78, 0.2, 0.167, 0.078]], [100, [0.17, 0.17, 0.12, 0.21, 0.19, 0.14]]]
```

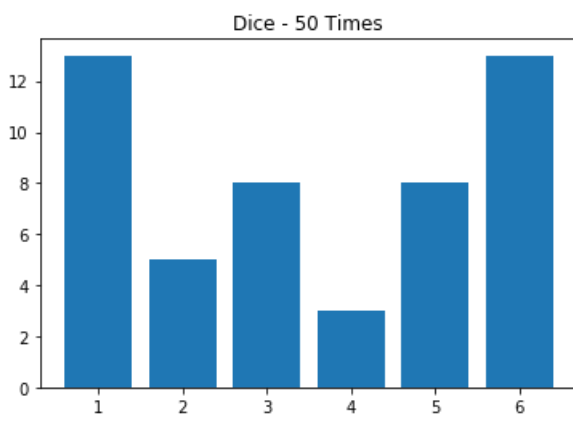In [80]:

```python
import pylab as plt

x = range(1, 7)
W = cnt[0][1]
plt.bar(x, W)
plt.title("Dice - 10 Times")
plt.show()
```

Dice 10 Times
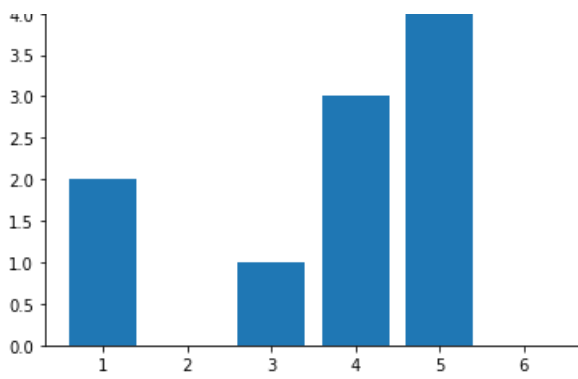
In [81]:

```python
W = cnt[4][1]
plt.bar(x, W)
plt.title("Dice - 50 Times")
plt.show()
```

Dice - 50 Times

In [82]:

```python
W = cnt[9][1]
plt.bar(x, W)
plt.title("Dice - 100 Times")
plt.show()
```

Dice - 100 Times