

### 1. Basic Single-Path, Positive Costs

**Input Data's':** {'a': {'capacity': 10, 'cost': 1}}, 'a': {'t': {'capacity': 10, 'cost': 1}}

**Ans :: Max Flow: 10, Min Cost:  $10 \times (1+1) = 20$**

### 2. Multi-Path Choice

**Input Data's':** {'a': {'capacity': 1, 'cost': 1}, 'b': {'capacity': 10, 'cost': 10}}, 'a': {'t': {'capacity': 1, 'cost': 1}}, 'b': {'t': {'capacity': 10, 'cost': 10}}

**Ans :: Max Flow: 11, Min Cost:  $(1 \times 2) + (10 \times 20) = 202$**

### 3. Negative Cost Edge

**Input Data's':** {'a': {'capacity': 5, 'cost': 10}, 'b': {'capacity': 5, 'cost': 5}}, 'a': {'t': {'capacity': 5, 'cost': 10}}, 'b': {'a': {'capacity': 5, 'cost': -10}}

**Ans :: Max Flow : 5 , MinCost : 25**

### 4. Residual Graph & Path Re-Routing

**Input Data's':** {'a': {'capacity': 1, 'cost': 1}, 'b': {'capacity': 10, 'cost': 5}}, 'a': {'t': {'capacity': 1, 'cost':

10}, 'b': {'capacity': 1, 'cost': 0}}, 'b':  
{ 't': {'capacity': 10, 'cost': 5}}

Ans :: Max Flow: 11, Min Cost:

$$(10 \times 10) + (1 \times 6) = 106$$

## 5. Capacity Bottleneck and Multiple Augmentations

Input Data's': {'a': {'capacity': 2, 'cost':  
1}}, 'a': {'b': {'capacity': 10, 'cost':  
1}}, 'b': {'t': {'capacity': 3, 'cost': 1}}

Ans :: Max Flow:  $2+1=3$ , Min Cost:  $3 \times 3=9$