**Activity 2**

**1.Coverted to Binary Values ( Gender Excluded):**

| Name | Fever | Cough | Test-1 | Test-2 | Test-3 | Test-4 |
|---|---|---|---|---|---|---|
| Jack | 1 | 0 | 1 | 0 | 0 | 0 |
| Mary | 1 | 0 | 1 | 0 | 1 | 0 |
| Jim | 1 | 1 | 0 | 0 | 0 | 0 |

**2. Jaccard Formula**

$$Jaccard = \frac{f_{11}}{f_{01} + f_{10} + f_{11}}$$

where:

- $f_{11}$ = number of attributes where both are 1
- $f_{01}$ = number of attributes where first is 0, second is 1
- $f_{10}$ = number of attributes where first is 1, second is 0

**3.Jaccaed coefficients:**

### (Jack, Mary)

| Attribute | Jack | Mary | Result |
|---|---|---|---|
| Fever | 1 | 1 | $f_{11}+=1$ |
| Cough | 0 | 0 | ignore |
| Test-1 | 1 | 1 | $f_{11}+=1$ |
| Test-2 | 0 | 0 | ignore |
| Test-3 | 0 | 1 | $f_{01}+=1$ |
| Test-4 | 0 | 0 | ignore |

- $f_{11} = 2$
- $f_{10} = 0$
- $f_{01} = 1$

$$\text{Jaccard Distance} = \frac{1+0}{1+0+2} = \frac{1}{3} \approx 0.33$$

### (Jack, Jim)

| Attribute | Jack | Jim | Result |
|---|---|---|---|
| Fever | 1 | 1 | $f_{11}+=1$ |
| Cough | 0 | 1 | $f_{01}+=1$ |
| Test-1 | 1 | 0 | $f_{10}+=1$ |
| Test-2 | 0 | 0 | ignore |
| Test-3 | 0 | 0 | ignore |
| Test-4 | 0 | 0 | ignore |

- $f_{11} = 1$
- $f_{10} = 1$
- $f_{01} = 1$

$$\text{Jaccard Distance} = \frac{1+1}{1+1+1} = \frac{2}{3} \approx 0.67$$

**(Jim, Mary)**

| Attribute | Jim | Mary | Result |
|---|---|---|---|
| Fever | 1 | 1 | $f_{11} += 1$ |
| Cough | 1 | 0 | $f_{10} += 1$ |
| Test-1 | 0 | 1 | $f_{01} += 1$ |
| Test-2 | 0 | 0 | ignore |
| Test-3 | 0 | 1 | $f_{01} += 1$ |
| Test-4 | 0 | 0 | ignore |

- $f_{11} = 1$
- $f_{10} = 1$
- $f_{01} = 2$

$$\text{Jaccard Distance} = \frac{1+2}{1+2+1} = \frac{3}{4} = 0.75$$

**Final Answers:**

**Jack & Mary = 0.33**

**Jack & Jim = 0.67**

**Jim & Mary = 0.75**