<table>
<tr><th colspan="5">PRECISION BCUBED CALCULATION</th></tr>
<tr><th colspan="3">Ground Truth</th><th colspan="2">Predicted Results</th></tr>
<tr><td colspan="3"><b>ldict</b> = {
    "item1": set(["black"]),
    "item2": set(["gray"]),
    "item3": set(["blue"]),
    "item4": set(["dashed"]),}</td><td colspan="2"><b>cdict</b> = {
    "item1": set(["black", "gray"]),
    "item2": set(["black", "gray"]),
    "item3": set(["blue"]),
    "item4": set(["dashed"]),}</td></tr>
<tr><td colspan="5"><b>Item1</b> of cdict is checked against all the items of cdict to find if they have any shared values.</td></tr>
<tr><td><b>el1 & el2</b></td><td><b>bool(el1 & el2)</b></td><td><b>values(el1 & el2)</b></td><td><b>mult_precision(el1, el2, cdict, ldict) →</b></td><td><b>len_cdict = len(cdict[el1] & cdict[el2])
len_ldict = len(ldict[el1] & ldict[el2])
precision =
min(len_cdict,len_ldict)/len_cdict</b></td></tr>
<tr><td>(Item1 & Item1)</td><td>True</td><td>{black, gray}</td><td>mult_precision(Item1, Item1, cdict, ldict)</td><td>len_cdict = 2
len_ldict = 1
precision = min(2,1)/2 = 1 / 2
= 0.5</td></tr>
<tr><td>(Item1 & Item2)</td><td>True</td><td>{black, gray}</td><td>mult_precision(Item1, Item2, cdict, ldict)</td><td>len_cdict = 2
len_ldict = 0
precision = min(2,0)/2 = 0 / 2
= 0.0</td></tr>
<tr><td>(Item1 & Item3)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item1 & Item4)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Mean = (0.5 + 0.0) / 2
Mean = 0.25</td></tr>
<tr><td colspan="5"><b>Item2</b> of cdict is checked against all the items of cdict to find if they have any shared values.</td></tr>
<tr><td><b>el1 & el2</b></td><td><b>bool(el1 & el2)</b></td><td><b>values(el1 & el2)</b></td><td><b>mult_precision(el1, el2, cdict, ldict) →</b></td><td><b>len_cdict = len(cdict[el1] & cdict[el2])
len_ldict = len(ldict[el1] & ldict[el2])
precision =
min(len_cdict,len_ldict)/len_cdict</b></td></tr>
<tr><td>(Item2 & Item1)</td><td>True</td><td>{black, gray}</td><td>mult_precision(Item2, Item1, cdict, ldict)</td><td>len_cdict = 2
len_ldict = 0
precision = min(2,0)/2 = 0 / 2
= 0.0</td></tr>
<tr><td>(Item2 & Item2)</td><td>True</td><td>{black, gray}</td><td>mult_precision(Item2, Item2, cdict, ldict)</td><td>len_cdict = 2
len_ldict = 1
precision = min(2,1)/2 = 1 / 2
= 0.5</td></tr>
<tr><td>(Item2 & Item3)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item2 & Item4)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Mean = (0.0 + 0.5) / 2
Mean = 0.25</td></tr>
<tr><td colspan="5"><b>Item3</b> of cdict is checked against all the items of cdict to find if they have any shared values.</td></tr>
<tr><td><b>el1 & el2</b></td><td><b>bool(el1 & el2)</b></td><td><b>values(el1 & el2)</b></td><td><b>mult_precision(el1, el2, cdict, ldict) →</b></td><td><b>len_cdict = len(cdict[el1] & cdict[el2])
len_ldict = len(ldict[el1] & ldict[el2])
precision =
min(len_cdict,len_ldict)/len_cdict</b></td></tr>
<tr><td>(Item3 & Item1)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item3 & Item2)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item3 & Item3)</td><td>True</td><td>{blue}</td><td>mult_precision(Item3, Item3, cdict, ldict)</td><td>len_cdict = 1
len_ldict = 1
precision = min(1,1)/1 = 1 / 1
= 1</td></tr>
<tr><td>(Item3 & Item4)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Mean = 1</td></tr>
<tr><td colspan="5"><b>Item4</b> of cdict is checked against all the items of cdict to find if they have any shared values.</td></tr>
<tr><td><b>el1 & el2</b></td><td><b>bool(el1 & el2)</b></td><td><b>values(el1 & el2)</b></td><td><b>mult_precision(el1, el2, cdict, ldict) →</b></td><td><b>len_cdict = len(cdict[el1] & cdict[el2])
len_ldict = len(ldict[el1] & ldict[el2])
precision =
min(len_cdict,len_ldict)/len_cdict</b></td></tr>
<tr><td>(Item4 & Item1)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item4 & Item2)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item4 & Item3)</td><td>False</td><td></td><td></td><td></td></tr>
<tr><td>(Item4 & Item4)</td><td>True</td><td>{dashed}</td><td>mult_precision(Item4, Item4, cdict, ldict)</td><td>len_cdict = 1
len_ldict = 1
precision = min(1,1)/1 = 1 / 1
= 1</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Mean = 1</td></tr>
<tr><td colspan="5">Final Mean = (0.25 + 0.25 + 1 + 1) / 4 = 0.625
<b>Final Precision = 0.625</b></td></tr>
</table>

RECALL BCUBED CALCULATION

Ground Truth	**Predicted Results**
ldict = { "item1": set(["black"]), "item2": set(["gray"]), "item3": set(["blue"]), "item4": set(["dashed"]),}	**cdict** = { "item1": set(["black", "gray"]), "item2": set(["black", "gray"]), "item3": set(["blue"]), "item4": set(["dashed"]),}

Item1 of cdict is checked against all the items of cdict to find if they have any shared values.

el1 & el2	**bool(el1 & el2)**	**values(el1 & el2)**	**mult_recall(el1, el2, cdict, ldict) →**	**len_cdict = len(cdict[el1] & cdict[el2])** **len_ldict = len(ldict[el1] & ldict[el2])** **precision = min(len_cdict,len_ldict)/len_ldict**

(Item1 & Item1)	True	{black, gray}	mult_recall(Item1, Item1, cdict, ldict)	len_cdict = 2
				len_ldict = 1
				precision = min(2,1)/2 = 1 / 1
				= 1

(Item1 & Item2)	True	{black, gray}	mult_recall(Item1, Item2, cdict, ldict)	len_cdict = 2
				len_ldict = 0
				precision = min(2,0)/2 = 0 / 0
				= indeterminate

(Item1 & Item3)	False			
(Item1 & Item4)	False			
				Mean = 1

Item2 of cdict is checked against all the items of cdict to find if they have any shared values.

el1 & el2	**bool(el1 & el2)**	**values(el1 & el2)**	**mult_recall(el1, el2, cdict, ldict) →**	**len_cdict = len(cdict[el1] & cdict[el2])** **len_ldict = len(ldict[el1] & ldict[el2])** **precision = min(len_cdict,len_ldict)/len_ldict**

(Item2 & Item1)	True	{black, gray}	mult_recall(Item2, Item1, cdict, ldict)	len_cdict = 2
				len_ldict = 0
				precision = min(2,0)/2 = 0 / 0
				= indeterminate

(Item2 & Item2)	True	{black, gray}	mult_recall(Item2, Item2, cdict, ldict)	len_cdict = 2
				len_ldict = 1
				precision = min(2,1)/2 = 1 / 1
				= 1

(Item2 & Item3)	False			
(Item2 & Item4)	False			
				Mean = 1

Item3 of cdict is checked against all the items of cdict to find if they have any shared values.

el1 & el2	**bool(el1 & el2)**	**values(el1 & el2)**	**mult_recall(el1, el2, cdict, ldict) →**	**len_cdict = len(cdict[el1] & cdict[el2])** **len_ldict = len(ldict[el1] & ldict[el2])** **precision = min(len_cdict,len_ldict)/len_ldict**
(Item3 & Item1)	False			
(Item3 & Item2)	False			

(Item3 & Item3)	True	{blue}	mult_recall(Item3, Item3, cdict, ldict)	len_cdict = 1
				len_ldict = 1
				precision = min(1,1)/1 = 1 / 1
				= 1

(Item3 & Item4)	False			
				Mean = 1

Item4 of cdict is checked against all the items of cdict to find if they have any shared values.

el1 & el2	**bool(el1 & el2)**	**values(el1 & el2)**	**mult_recall(el1, el2, cdict, ldict) →**	**len_cdict = len(cdict[el1] & cdict[el2])** **len_ldict = len(ldict[el1] & ldict[el2])** **precision = min(len_cdict,len_ldict)/len_ldict**
(Item4 & Item1)	False			
(Item4 & Item2)	False			
(Item4 & Item3)	False			

(Item4 & Item4)	True	{dashed}	mult_recall(Item4, Item4, cdict, ldict)	len_cdict = 1
				len_ldict = 1
				precision = min(1,1)/1 = 1 / 1
				= 1

				Mean = 1

Final Mean = (1 + 1 + 1 + 1) / 4 = 1
Final recall = 1