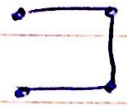
QuHack

$d = 1$

$b = -1$

$a = -1$

$c = 2$



A5) QUBO Friends (X Y)

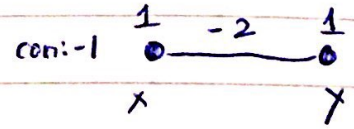
X	Y	QUBO $(ax + by + cxy + d)$
0	0	-1
0	1	0
1	0	0
1	1	-1

$\Rightarrow d = -1$

$b + d = 0 \Rightarrow b = 1$

$a + d = 0 \Rightarrow a = 1$

$a + b + c + d = -1 \Rightarrow c = -2$



Obj1: $x + y - 2xy - 1$

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QUBO Enemies (y z)

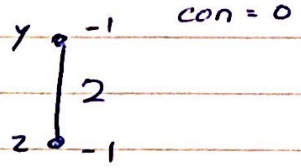
y	z	QUBO $(ay + bz + cyz + d)$
0	0	0
0	1	-1
1	0	-1
1	1	0

$\Rightarrow d = 0$

$b + d = -1 \Rightarrow b = -1$

$a + d = -1 \Rightarrow a = -1$

$a + b + c + d = 0 \Rightarrow c = 2$



Obj2: $-y - z + 2yz$

QUBO Friends (z w)

z	w	QUBO $(az + bw + czw + d)$
0	0	-1
0	1	0
1	0	0
1	1	-1

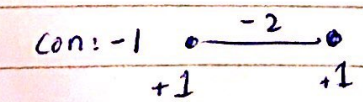
$\Rightarrow d = -1$

$b = 1$

$a = 1$

$c = -2$

Obj3: $z + w - 2zw - 1$



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So the QUBO for all 3 cases would be,

$$Obj\,1 + Obj\,2 + Obj\,3$$

$$= x + y - 2xy - 1 + (-y - z + 2yz) + (z + w - 2zw - 1)$$

$$= x + w - 2xy + 2yz - 2zw - 2$$

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