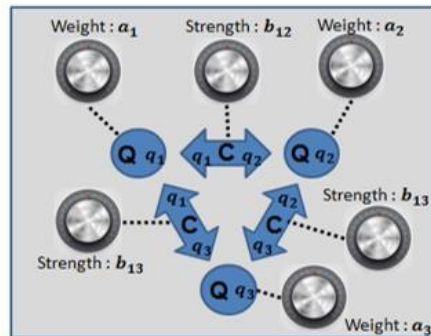


**Name:** Sai Krishna Teja Varma Manthena

**Unity ID:** smanthe

2. a)

### Programming Model: Three qubits



$$O(a_i, b_{ij}; q_i) = a_1 q_1 + a_2 q_2 + a_3 q_3 + b_{12} q_1 q_2 + b_{13} q_1 q_3 + b_{23} q_2 q_3$$

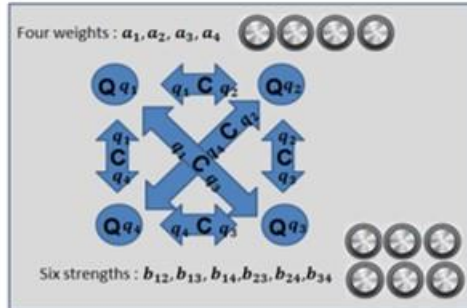
QMI (Quantum Machine Instruction):  $a_1$   $a_2$   $a_3$   $b_{12}$   $b_{13}$   $b_{23}$

$q_1$	$q_2$	$q_3$	Objective
0	0	0	0
0	0	1	-3
0	1	0	-2
0	1	1	-3
1	0	0	-2
1	0	1	-3
1	1	0	-3
1	1	1	-2

$a_1$	$a_2$	$a_3$	$b_{12}$	$b_{13}$	$b_{23}$
-2	-2	-3	1	2	2

b)

## Programming Model: Four qubits



$$O(a_i, b_{ij}; q_i) = a_1 q_1 + a_2 q_2 + a_3 q_3 + a_4 q_4 + b_{12} q_1 q_2 + b_{13} q_1 q_3 + b_{14} q_1 q_4 + b_{23} q_2 q_3 + b_{24} q_2 q_4 + b_{34} q_3 q_4$$

QMI :  $a_1, a_2, a_3, a_4, b_{12}, b_{13}, b_{14}, b_{23}, b_{24}, b_{34}$

$a_1$	$a_2$	$a_3$	$a_4$	$b_{12}$	$b_{13}$	$b_{14}$	$b_{23}$	$b_{24}$	$b_{34}$
-2	-2	-0.5	-0.5	1	2	0	0	2	-2

$q_1$	$q_2$	$q_3$	$q_4$	Objective
0	0	0	0	0
0	0	0	1	-0.5
0	0	1	0	-0.5
0	0	1	1	-3
0	1	0	0	-2
0	1	0	1	-0.5
0	1	1	0	-2.5
0	1	1	1	-3
1	0	0	0	-2
1	0	0	1	-2.5
1	0	1	0	-0.5
1	0	1	1	-3
1	1	0	0	-3
1	1	0	1	-1.5
1	1	1	0	-1.5
1	1	1	1	-2