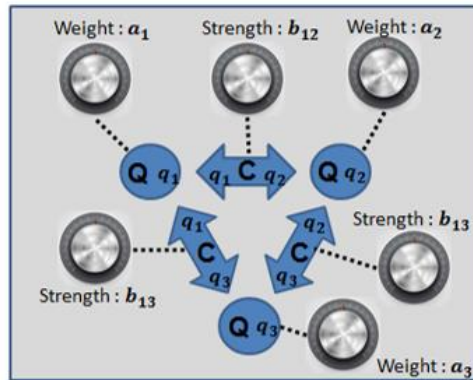


2.

3-qubits

Programming Model: Three qubits



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

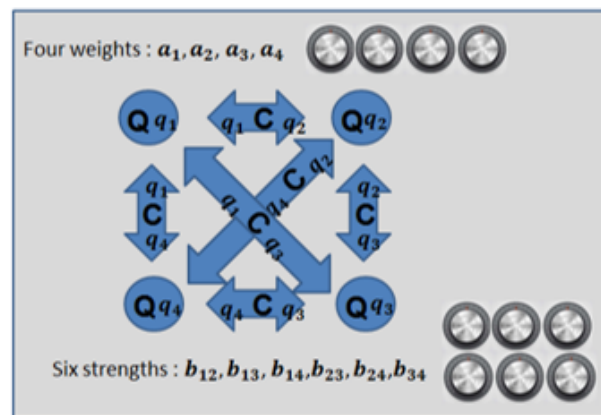
QMI (Quantum Machine Instruction) : $a_1 \ a_2 \ a_3 \ b_{12} \ b_{13} \ b_{23}$

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

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

Quantum Computing HW1 Problem 2

4-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 : $a_1 \quad a_2 \quad a_3 \quad a_4 \quad b_{12} \quad b_{13} \quad b_{14} \quad b_{23} \quad b_{24} \quad b_{34}$

a_1	a_2	a_3	a_4	b_{12}	b_{13}	b_{14}	b_{23}	b_{24}	b_{34}
-1	-1	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	-1
0	1	0	0	-1
0	1	0	1	1.5
0	1	1	0	-0.5
0	1	1	1	0
1	0	0	0	-1
1	0	0	1	-0.5
1	0	1	0	1.5
1	0	1	1	0
1	1	0	0	-1
1	1	0	1	1.5
1	1	1	0	1.5
1	1	1	1	2