These tables show the benchmark result of various layouts running benchmark algorithms for 5, 10, and 15 circuit size. layout: layout configuration with the first number is the number of qubits and the second one is the number of group benchmark: benchmark algorithms

g: total number of gates

d: circuit depth

 s_B : total additional swap gates for "swap basic"

 s_S : total additional swap gates for "swap sabre"

 s_L : total additional swap gates for "swap lookahead"

 Δs_B : gate difference between "swap basic-lookahead" (%)

 Δs_S : gate difference between "swap sabre-lookahead" (%)

 d_B : circuit depth for "swap basic"

 d_S : circuit depth for "swap sabre", d_L : circuit depth for "swap lookahead"

 Δd_B : depth difference between "swap basic-lookahead" (%) Δd_S : depth difference between "swap sabre-lookahead" (%)

Table 1: Additional swap gates and circuit depth, n = 5

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
$full_20_1$	ghz	7	7	0	0	0	nan	nan	7	7	7	0	0
full_20_1	$\mathrm{d}\mathrm{j}$	36	11	0	0	0	nan	nan	11	11	11	0	0
$full_20_1$	graphstate	50	22	0	0	0	nan	nan	22	22	22	0	0
$full_20_1$	qft	71	38	0	0	0	nan	nan	38	38	38	0	0
$full_20_1$	wstate	73	45	0	0	0	nan	nan	45	45	45	0	0
full_20_1	qftentangled	78	42	0	0	0	nan	nan	42	42	42	0	0
full_20_1	vqe	83	21	0	0	0	nan	nan	21	21	21	0	0
full_20_1	qaoa	95	31	0	0	0	nan	nan	31	31	31	0	0
full_20_1	realamprandom	130	37	0	0	0	nan	nan	37	37	37	0	0
$full_20_1$	two local random	130	37	0	0	0	nan	nan	37	37	37	0	0
full_20_1	su2random	150	41	0	0	0	nan	nan	41	41	41	0	0
full_20_1	qnn	154	58	0	0	0	nan	nan	58	58	58	0	0
$full_20_1$	portfolioqaoa	195	72	0	0	0	nan	nan	72	72	72	0	0
$full_20_1$	random	223	97	0	0	0	nan	nan	97	97	97	0	0
$full_20_1$	portfoliovqe	310	107	0	0	0	nan	nan	107	107	107	0	0
$full_10_2$	ghz	7	7	0	0	0	nan	nan	7	7	7	0	0
$full_10_2$	$\mathrm{d}\mathrm{j}$	36	11	0	3	0	nan	100	11	17	11	0	35.29
$full_10_2$	graphstate	50	22	0	0	0	nan	nan	22	22	22	0	0
$full_10_2$	qft	71	38	0	0	0	nan	nan	38	38	38	0	0
$full_10_2$	wstate	73	45	0	0	0	nan	nan	45	45	45	0	0
$full_10_2$	qftentangled	78	42	0	0	0	nan	nan	42	42	42	0	0
$full_10_2$	vqe	83	21	0	0	0	nan	nan	21	21	21	0	0
$full_10_2$	qaoa	95	31	0	0	0	nan	nan	31	31	31	0	0
$full_10_2$	realamprandom	130	37	0	0	0	nan	nan	37	37	37	0	0
$full_10_2$	two local random	130	37	0	0	0	nan	nan	37	37	37	0	0
$full_10_2$	su2random	150	41	0	15	0	nan	100	41	81	41	0	49.38
$full_10_2$	qnn	154	58	0	0	0	nan	nan	58	58	58	0	0
$full_10_2$	portfolioqaoa	195	72	0	0	0	nan	nan	72	72	72	0	0
full_10_2	random	223	97	0	6	0	nan	100	97	141	97	0	31.21
full_10_2	portfoliovqe	310	107	0	0	0	nan	nan	107	107	107	0	0
$grid_9_2$	ghz	7	7	6	0	6	0	nan	13	7	8	38.46	-14.29
$grid_9_2$	$\dot{\mathrm{d}}\mathrm{j}$	36	11	9	3	0	100	100	21	14	11	47.62	21.43
$grid_9_2$	graphstate	50	22	15	3	6	60	-100	37	25	20	45.95	20
$grid_{-}9_{-}2$	qft	71	38	39	15	21	46.15	-40	74	59	41	44.59	30.51
$grid_9_2$	wstate	73	45	18	0	12	33.33	nan	54	45	41	24.07	8.89
$grid_9_2$	qftentangled	78	42	45	18	27	40	-50	87	60	45	48.28	25
grid_9_2	vqe	83	21	15	0	12	20	nan	35	21	27	22.86	-28.57
grid_9_2	qaoa	95	31	9	9	21	-133.33	-133.33	37	58	48	-29.73	17.24
grid_9_2	realamprandom	130	37	96	42	42	56.25	0	145	97	66	54.48	31.96
grid_9_2	twolocalrandom	130	37	96	42	42	56.25	0	145	100	66	54.48	34
grid_9_2	su2random	150	41	96	39	42	56.25	-7.69	155	102	70	54.84	31.37
grid_9_2	qnn	154	58	63	30	66	-4.76	-120	132	103	84	36.36	18.45
grid_9_2	portfolioqaoa	195	72	96	39	69	28.12	-76.92	199	132	121	39.2	8.33
grid_9_2	random	223	97	30	12	27	10	-125	114	117	111	2.63	5.13
grid_9_2	portfoliovqe	310	107	96	42	57	40.62	-35.71	209	154	111	46.89	27.92

	layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
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ring_7_3 random 223 97 60 12 66 -10 -450 157 106 121 22.93 -14.15 ring_7_3 portfoliovqe 310 107 120 48 93 22.5 -93.75 179 193 125 30.17 35.23		portfolioqaoa	195	72	120	51	87	27.5	-70.59	157	161	110	29.94	31.68
full_5_4 ghz 7 7 0 0 0 nan nan 7 7 7 0 0								22.5	-93.75					
	full_5_4	ghz	7	7	0	0	0	nan	nan	7	7	7	0	0

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
full_5_4	dj	36	11	$\frac{-b_B}{0}$	3	$\frac{\partial L}{\partial t}$	nan	$\frac{\Delta s}{100}$	11	$\frac{as}{14}$	$\frac{a_L}{11}$	$\frac{\Delta a_B}{0}$	$\frac{\Delta a_{S}}{21.43}$
full_5_4	graphstate	50 50	21	0	6	0	nan	100	21	26	21	0	19.23
full_5_4	qft	71	38	0	6	0	nan	100	38	46	38	0	17.39
full_5_4	wstate	73	45	0	0	0	nan	nan	45	45	45	0	0
$full_5_4$	qftentangled	78	42	0	6	0	nan	100	42	63	42	0	33.33
$full_5_4$	vqe	83	21	0	0	0	nan	nan	21	21	21	0	0
$full_5_4$	qaoa	95	31	0	3	0	nan	100	31	42	31	0	26.19
$full_5_4$	${\it real amprandom}$	130	37	0	45	0	nan	100	37	103	37	0	64.08
$full_5_4$	two local random	130	37	0	45	0	nan	100	37	99	37	0	62.63
$full_5_4$	su2random	150	41	0	15	0	nan	100	41	81	41	0	49.38
full_5_4	qnn	154	58	0	9	0	nan	100	58	87	58	0	33.33
full_5_4	portfolioqaoa	195	72	0	42	0	nan	100	72	164	72	0	56.1
full_5_4	random	223	97	0	12	0	nan	100	97	106	97	0	8.49
full_5_4 grid_6_4	portfoliovqe	310	107 7	0 6	48	$0 \\ 3$	nan 50	100	107 13	$172 \\ 7$	107 8	$0 \\ 38.46$	37.79 -14.29
grid_6_4 grid_6_4	$_{ m dj}^{ m ghz}$	7 36	11	18	0 9	3	83.33	nan 66.67	$\frac{13}{22}$	20	12	45.45	-14.29 40
grid_6_4	graphstate	50	21	12	3	3	75	00.07	$\frac{22}{32}$	$\frac{20}{24}$	21	34.38	12.5
grid_6_4	qft	71	38	33	15	18	45.45	-20	70	$\frac{24}{54}$	$\frac{21}{34}$	51.43	37.04
grid_6_4	wstate	73	45	15	0	3	80	nan	51	45	46	9.8	-2.22
grid_6_4	qftentangled	78	42	33	18	27	18.18	-50	78	63	48	38.46	23.81
$grid_6_4$	vqe	83	21	6	0	12	-100	nan	26	21	25	3.85	-19.05
$\operatorname{grid}_{-6}_{-4}$	qaoa	95	31	6	3	9	-50	-200	31	42	38	-22.58	9.52
$grid_6_4$	realamprandom	130	37	75	42	45	40	-7.14	143	91	60	58.04	34.07
$grid_{-}6_{-}4$	two local random	130	37	75	42	45	40	-7.14	143	91	60	58.04	34.07
$grid_6_4$	su2random	150	41	75	42	45	40	-7.14	155	97	64	58.71	34.02
$grid_6_4$	qnn	154	58	48	30	51	-6.25	-70	122	98	78	36.07	20.41
$grid_6_4$	portfolioqaoa	195	72	75	51	57	24	-11.76	187	155	91	51.34	41.29
grid_6_4	random	223	97	36	12	21	41.67	-75	162	106	106	34.57	0
grid_6_4	portfoliovqe	310	107	75	42	48	36	-14.29	192	171 - 7	117	39.06	31.58
ring_5_4 ring_5_4	$_{ m dj}^{ m ghz}$	7 36	7 11	0 9	$0 \\ 3$	9	$\begin{array}{c} \text{nan} \\ 66.67 \end{array}$	nan	$7 \\ 24$	7 18	8 12	-14.29 50	-14.29 33.33
ring_5_4 ring_5_4	graphstate	50 50	21	3	5 6	6	-100	$0 \\ 0$	$\frac{24}{25}$	22	21	16	33.33 4.55
ring_5_4	qft	71	38	27	15	18	33.33	-20	65	60	43	33.85	28.33
ring_5_4	wstate	73	45	0	0	9	nan	nan	45	45	40	11.11	11.11
$ring_5_4$	qftentangled	78	42	27	21	30	-11.11	-42.86	69	76	49	28.99	35.53
$ring_5_4$	vqe	83	21	0	0	15	nan	nan	21	21	29	-38.1	-38.1
$ring_5_4$	qaoa	95	31	18	9	27	-50	-200	53	48	45	15.09	6.25
$ring_5_4$	realamprandom	130	37	57	48	60	-5.26	-25	86	107	66	23.26	38.32
$ring_5_4$	two local random	130	37	57	51	60	-5.26	-17.65	86	112	66	23.26	41.07
$ring_5_4$	su2random	150	41	57	51	60	-5.26	-17.65	96	113	70	27.08	38.05
$ring_5_4$	qnn	154	58	48	39	nan	nan	nan	95	136	nan	nan	nan
$ring_5_4$	portfolioqaoa	195	72	57	51	87	-52.63	-70.59	116	159	110	5.17	30.82
$ring_{-5}_{-4}$	random	223	97	24	15	51	-112.5	-240	120	140	114	5	18.57
ring_5_4	portfoliovqe	310	107	57	48	93	-63.16	-93.75	146	193	125	14.38	35.23
t_horizontal_5_4	ghz J:	7 36	7 11	9 24	3	6	$33.33 \\ 87.5$	-100	$\frac{16}{37}$	10	9 12	43.75	10 14.29
t_horizontal_5_4 t_horizontal_5_4	dj graphstate	50 50	$\frac{11}{22}$	12	9	3 9	25	0	35	14 28	20	67.57 42.86	28.57
t_horizontal_5_4	graphstate	71	38	48	9 15	$\frac{9}{24}$	50	-60	82	60	$\frac{20}{42}$	42.80	30
t_horizontal_5_4	wstate	73	45	18	0	6	66.67	nan	58	45	39	32.76	13.33
t_horizontal_5_4	qftentangled	78	42	60	21	33	45	-57.14	90	76	48	46.67	36.84
t_horizontal_5_4	vqe	83	21	12	0	12	0	nan	33	21	25	24.24	-19.05
t_horizontal_5_4	qaoa	95	31	33	9	24	27.27	-166.67	100	48	$\frac{25}{45}$	55	6.25
$t_{-horizontal_{-}5_{-}4}$	realamprandom	130	37	117	48	60	48.72	-25	185	107	66	64.32	38.32
$t_{range} = t_{same} = t_{same}$	twolocalrandom	130	37	117	72	60	48.72	16.67	185	113	66	64.32	41.59
$t_{horizontal_5_4}$	su2random	150	41	117	72	60	48.72	16.67	198	135	70	64.65	48.15
$t_horizontal_5_4$	qnn	154	58	81	39	66	18.52	-69.23	172	131	84	51.16	35.88
$t_{horizontal_5_4}$	portfolioqaoa	195	72	117	48	87	25.64	-81.25	252	153	110	56.35	28.1
t_horizontal_5_4	random	223	97	36	12	66	-83.33	-450	151	106	121	19.87	-14.15
t_horizontal_5_4	portfoliovqe	310	107	117	69	93	20.51	-34.78	239	187	125	47.7	33.16
t_vertical_5_4	ghz	7	7	9	3	6	33.33	-100	16	10	9	43.75	10
t_vertical_5_4	dj	36	11	24	3	3	87.5	0	37	18	12	67.57	33.33

Table 1: Additional swap gates and circuit depth, $n\,=\,5$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
$t_{vertical_5_4}$	graphstate	50	22	12	9	9	25	0	35	28	20	42.86	28.57
$t_{\text{vertical}}_{5_{\text{-}}4}$	qft	71	38	48	18	24	50	-33.33	82	59	42	48.78	28.81
$t_{\text{vertical}}_{5_{\text{-}}4}$	wstate	73	45	18	0	6	66.67	nan	58	45	39	32.76	13.33
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	qftentangled	78	42	60	24	33	45	-37.5	90	73	48	46.67	34.25
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	vqe	83	21	12	0	12	0	nan	33	21	25	24.24	-19.05
$t_{vertical_5_4}$	qaoa	95	31	33	9	24	27.27	-166.67	100	48	45	55	6.25
$t_{\text{vertical}}_{5_{\text{-}}4}$	realamprandom	130	37	117	51	60	48.72	-17.65	185	109	66	64.32	39.45
$t_{\text{vertical}}_{5_{\text{-}}4}$	two local random	130	37	117	48	60	48.72	-25	185	107	66	64.32	38.32
$t_{\text{vertical}}_{5_{\text{-}}4}$	su2random	150	41	117	48	60	48.72	-25	198	110	70	64.65	36.36
$t_{vertical_5_4}$	qnn	154	58	81	48	66	18.52	-37.5	172	127	84	51.16	33.86
$t_{vertical_5_4}$	portfolioqaoa	195	72	117	51	87	25.64	-70.59	252	164	110	56.35	32.93
$t_{vertical_5_4}$	random	223	97	36	12	66	-83.33	-450	151	106	121	19.87	-14.15
$t_{\text{vertical}}_{5_{\text{-}}4}$	portfoliovqe	310	107	117	48	93	20.51	-93.75	239	193	125	47.7	35.23
$line_1_20$	ghz	7	7	0	0	18	nan	nan	7	7	9	-28.57	-28.57
$line_1_20$	$\mathrm{d}\mathrm{j}$	36	11	36	6	6	83.33	0	40	24	14	65	41.67
$line_1_20$	graphstate	50	22	12	9	12	0	-33.33	32	28	21	34.38	25
$line_1_20$	qft	71	38	72	24	24	66.67	0	92	57	42	54.35	26.32
$line_1_20$	wstate	73	45	0	0	15	nan	nan	45	45	33	26.67	26.67
$line_1_20$	qftentangled	78	42	72	24	36	50	-50	96	73	50	47.92	31.51
$line_1_20$	vqe	83	21	0	0	15	nan	nan	21	21	24	-14.29	-14.29
$line_1_20$	qaoa	95	31	48	12	18	62.5	-50	106	42	39	63.21	7.14
$line_1_20$	real amprandom	130	37	180	69	93	48.33	-34.78	206	113	59	71.36	47.79
$line_1_20$	two local random	130	37	180	69	93	48.33	-34.78	206	113	59	71.36	47.79
$line_1_20$	su2random	150	41	180	72	93	48.33	-29.17	219	135	63	71.23	53.33
$line_1_20$	qnn	154	58	120	48	84	30	-75	172	127	80	53.49	37.01
$line_1_20$	portfolioqaoa	195	72	180	66	93	48.33	-40.91	255	159	90	64.71	43.4
$line_1_20$	random	223	97	63	12	30	52.38	-150	160	106	99	38.12	6.6
$line_1_20$	portfoliovqe	310	107	180	69	90	50	-30.43	242	187	126	47.93	32.62

Table 2: Additional swap gates and circuit depth, n=10

Mil. 20.1	layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
Fall Pall	full 20 1	ghz		12	0	0	0	nan	nan	12	12	12	0	0
Full Dull Part														
Full 20.1 vge														
Mill 10.1		~ -												
Mil. 19.1 qft														
Mull 201.														
Fall 20.1 order coalumproade 35.5 57.5 57.5 57.5 57.5 57.5 50.5 50.5 fall 20.1 coalumproade 335 57.5		_												
Full 20.1 reals approach reals app		_							nan					
Full 20.1 two local random 335 57 0 0 0 near near 57 57 57 0 0 0 0 0 0 0 0 0		•							nan					
Fall 20.1	$full_20_1$	_	335	57	0	0		nan	nan	57	57	57	0	0
Fall 20.1	$full_20_1$	su2random	375	61	0	0	0	nan	nan	61	61	61	0	0
full_20.1 randome 646 15.5 0 0 0 nonan nana 15.5 15.5 15.7 0 0 full_10.2 glu 12 12 0 0 0 nana 100 21.7 17 0 0 full_10.2 dig 17 7.7 0 6 0 nan 100 12 15 12 0 15 full_10.2 graphstate 163 90 0 3 0 nan 100 90 93 90 0 3.2 full_10.2 qeo 168 26 0 6 0 nan 100 90 3 3 0 0 3 3 0 13 3 4 3 4 4 0 3 3 1 0 1 2 2 2 0 3 3 1 1 2 2 1 3 <t< td=""><td>$full_20_1$</td><td>qnn</td><td>459</td><td>108</td><td>0</td><td>0</td><td>0</td><td>nan</td><td>nan</td><td>108</td><td>108</td><td>108</td><td>0</td><td>0</td></t<>	$full_20_1$	qnn	459	108	0	0	0	nan	nan	108	108	108	0	0
full.10.2 optoficiorege 1145 217 0 0 0 nam nam 217 217 20 0 full.10.2 glax 12 12 0 3 0 nam 100 12 12 0 0 full.10.2 graphstate 100 22 0 3 0 nam 100 22 25 22 0 12 full.10.2 westate 168 26 0 6 0 nam 100 26 38 26 0 3.33 full.10.2 quas 190 34 0 0 0 nam 100 82 178 80 3.33 full.10.2 qftentanagled 282 82 0 <td>$full_20_1$</td> <td>portfolioqaoa</td> <td>615</td> <td>132</td> <td>0</td> <td>0</td> <td>0</td> <td>nan</td> <td>nan</td> <td>132</td> <td>132</td> <td>132</td> <td>0</td> <td>0</td>	$full_20_1$	portfolioqaoa	615	132	0	0	0	nan	nan	132	132	132	0	0
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ring_10_2 qnn 459 108 663 267 432 34.84 -61.8 440 390 232 47.27 40.51 ring_10_2 portfolioqaoa 615 132 885 342 594 32.88 -73.68 606 443 292 51.82 34.09 ring_10_2 random 646 155 402 225 423 -5.22 -88 493 379 244 50.51 35.62 ring_10_2 portfoliovqe 1145 217 885 405 636 28.14 -57.04 636 617 298 53.14 51.7	-													
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ring_10_2 random 646 155 402 225 423 -5.22 -88 493 379 244 50.51 35.62 ring_10_2 portfoliovqe 1145 217 885 405 636 28.14 -57.04 636 617 298 53.14 51.7	-													
$ring_10_2 \qquad portfoliovqe \qquad 1145 217 885 405 636 28.14 -57.04 636 617 298 53.14 51.7$														
tull_7_3 ghz 12 12 0 3 0 nan 100 12 15 12 0 20														
	tull_7_3	ghz	12	12	0	3	U	nan	100	12	15	12	U	20

Table 2: Additional swap gates and circuit depth, n=10

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
full_7_3 full_7_3	dj graphstate	79 100	17 22	48 21	9	9 18	81.25 14.29	0 -200	70 43	$\frac{30}{22}$	$\frac{22}{26}$	68.57 39.53	26.67 -18.18
full_7_3	wstate	163	90	0	0	0	14.29 nan	nan	90	90	90	39.33 0	0
full_7_3	vqe	168	26	0	0	0	nan	nan	26	26	26	0	0
full_7_3	qaoa	190	34	48	9	15	68.75	-66.67	138	50	42	69.57	16
full_7_3	qft	270	78	168	63	150	10.71	-138.1	236	170	140	40.68	17.65
$full_7_3$	qftentangled	282	82	168	51	150	10.71	-194.12	240	191	144	40	24.61
$full_7_3$	realamprandom	335	57	471	219	141	70.06	35.62	632	299	130	79.43	56.52
$full_7_3$	two local random	335	57	471	135	141	70.06	-4.44	632	266	130	79.43	51.13
$full_7_3$	su2random	375	61	471	195	141	70.06	27.69	657	262	135	79.45	48.47
$full_7_3$	qnn	459	108	294	132	249	15.31	-88.64	531	366	214	59.7	41.53
full_7_3	portfolioqaoa	615	132	471	180	231	50.96	-28.33	845	406	239	71.72	41.13
full_7_3	random	646	155	159	102	132	16.98	-29.41	419	358	179	57.28	50
full_7_3	portfoliovqe	1145	217	471	132	255	45.86	-93.18	878	499	308	64.92	38.28
grid_8_3	ghz	12	12 17	9	9	18	-100	-100 20	21 79	18	18 25	14.29	0
grid_8_3 grid_8_3	dj graphstate	79 100	22	$\frac{108}{42}$	15 6	$\frac{12}{24}$	88.89 42.86	-300	60	$\frac{41}{25}$	25 21	68.35 65	39.02 16
grid_8_3	wstate	163	90	12	3	$\frac{24}{15}$	-25	-300 -400	99	93	65	34.34	30.11
grid_8_3	vqe	168	26	54	3	21	61.11	-600	60	$\frac{35}{35}$	31	48.33	11.43
grid_8_3	qaoa	190	$\frac{20}{34}$	96	21	33	65.62	-57.14	188	53	42	77.66	20.75
grid_8_3	qft	270	78	408	93	183	55.15	-96.77	318	183	119	62.58	34.97
grid_8_3	qftentangled	282	82	393	102	201	48.85	-97.06	314	175	138	56.05	21.14
grid_8_3	realamprandom	335	57	828	225	249	69.93	-10.67	669	245	120	82.06	51.02
$grid_8_3$	twolocalrandom	335	57	828	228	249	69.93	-9.21	669	234	120	82.06	48.72
$grid_8_3$	su2random	375	61	828	234	249	69.93	-6.41	690	260	123	82.17	52.69
$grid_8_3$	qnn	459	108	618	198	288	53.4	-45.45	594	315	181	69.53	42.54
$grid_8_3$	portfolioqaoa	615	132	828	249	450	45.65	-80.72	818	402	273	66.63	32.09
$grid_8_3$	random	646	155	327	165	306	6.42	-85.45	492	350	208	57.72	40.57
$grid_8_3$	portfoliovqe	1145	217	828	255	291	64.86	-14.12	890	477	251	71.8	47.38
$ring_{-7}_{-3}$	ghz	12	12	0	6	51	nan	-750	12	18	25	-108.33	-38.89
$ring_{-7}$	dj	79	17	126	18	24	80.95	-33.33	79	41	19	75.95	53.66
ring_7_3	graphstate	100 163	22 90	45	12	$\frac{45}{66}$	0	-275 -633.33	56 90	28 96	$\frac{31}{62}$	44.64 31.11	-10.71 35.42
$ring_{-}7_{-}3$ $ring_{-}7_{-}3$	wstate	168	90 26	$0 \\ 0$	9	66	nan	-055.55 -1000	90 26	90 44	43	-65.38	$\frac{33.42}{2.27}$
$ring_{-7}$ 3	vqe qaoa	190	$\frac{20}{34}$	81	6	75	nan 7.41	-1150	158	42	56	64.56	-33.33
ring_7_3	qft	270	78	540	108	159	70.56	-47.22	319	191	116	63.64	39.27
ring_7_3	qftentangled	282	82	540	138	nan	nan	nan	323	239	nan	nan	nan
ring_7_3	realamprandom	335	57	1299	342	435	66.51	-27.19	799	338	167	79.1	50.59
$ring_7_3$	twolocalrandom	335	57	1299	330	435	66.51	-31.82	799	365	167	79.1	54.25
$ring_{-}7_{-}3$	su2random	375	61	1299	345	435	66.51	-26.09	827	344	172	79.2	50
$ring_7_3$	qnn	459	108	816	240	nan	nan	nan	597	343	nan	nan	nan
$ring_{-}7_{-}3$	portfolioqaoa	615	132	1299	348	nan	nan	nan	925	482	nan	nan	nan
$ring_{-}7_{-}3$	random	646	155	417	213	nan	nan	nan	555	369	nan	nan	nan
$ring_7_3$	portfoliovqe	1145	217	1299	360	nan	nan	nan	947	600	nan	nan	nan
full_5_4	ghz	12	12	0	0	6	nan	nan	12	12	14	-16.67	-16.67
full_5_4	dj	79	17	36	12	3	91.67	75	56	40	20	64.29	50
full_5_4	graphstate	100	22	24	9	12	50	-33.33	50	25	25	50	0
full_5_4	wstate	163	90	0	0	9	nan	nan	90	90	68	24.44	24.44
full_5_4	vqe	168	26 34	0	0	$\frac{12}{24}$	nan	nan	26	26 53	31 43	-19.23	-19.23
$\frac{1}{5}4$ $\frac{5}{4}$	qaoa qft	190 270	54 78	63 198	6 60	90	$61.9 \\ 54.55$	-300 -50	150 280	55 160	$\frac{43}{117}$	71.33 58.21	18.87 26.88
full_5_4	qftentangled	282	82	198	63	102	48.48	-61.9	$\frac{280}{284}$	190	114	59.86	40
full_5_4 full_5_4	realamprandom	335	57	531	192	180	66.1	6.25	644	$\frac{190}{260}$	$114 \\ 137$	59.80 78.73	$40 \\ 47.31$
full_5_4	twolocalrandom	335	57	531	$\frac{192}{240}$	180	66.1	$\frac{0.25}{25}$	644	$\frac{200}{277}$	$137 \\ 137$	78.73	50.54
full_5_4	su2random	375	61	531	270	180	66.1	33.33	663	378	142	78.58	62.43
full_5_4	qnn	459	108	345	156	144	58.26	7.69	513	328	159	69.01	51.52
full_5_4	portfolioqaoa	612	132	531	237	297	44.07	-25.32	781	432	239	69.4	44.68
full_5_4	random	646	155	225	132	228	-1.33	-72.73	512	293	198	61.33	32.42
$full_{-}5_{-}4$	portfoliovqe	1145	217	531	246	240	54.8	2.44	818	671	279	65.89	58.42
$grid_{-}6_{-}4$	ghz	12	12	9	12	18	-100	-50	21	18	18	14.29	0
grid64	$\mathrm{d}\mathrm{j}$	79	17	108	15	12	88.89	20	79	37	25	68.35	32.43

Table 2: Additional swap gates and circuit depth, $n=10\,$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
grid_6_4	graphstate	100	22	51	9	54	-5.88	-500	71	25	25	64.79	0
$grid_{-}6_{-}4$	wstate	163	90	12	3	15	-25	-400	99	93	65	34.34	30.11
$grid_{-}6_{-}4$	vqe	168	26	54	3	21	61.11	-600	60	26	31	48.33	-19.23
$grid_{-}6_{-}4$	qaoa	190	34	96	18	33	65.62	-83.33	188	53	42	77.66	20.75
$grid_{-}6_{-}4$	qft	270	78	408	93	183	55.15	-96.77	318	189	119	62.58	37.04
grid_6_4	qftentangled	282	82	393	111	201	48.85	-81.08	314	189	138	56.05	26.98
grid_6_4	realamprandom	335	57	828	282	249	69.93	11.7	669	294	120	82.06	59.18
grid_6_4	twolocalrandom	335	57	828	222	249	69.93	-12.16	669	217	120	82.06	44.7
$ grid_{-}6_{-}4 $ $ grid_{-}6_{-}4 $	su2random	$375 \\ 459$	61 108	828 618	243 186	249 288	69.93 53.4	-2.47 -54.84	690 594	269 301	123 181	82.17 69.53	54.28 39.87
grid_6_4 grid_6_4	qnn portfolioqaoa	612	132	828	$\frac{160}{225}$	450	45.65	-34.64 -100	816	341	273	66.54	39.87 19.94
grid_6_4	random	646	152	327	162	306	6.42	-88.89	492	324	208	57.72	35.8
grid_6_4	portfoliovge	1145	217	828	219	291	64.86	-32.88	890	496	251	71.8	49.4
$ring_5_4$	ghz	12	12	0	9	45	nan	-400	12	15	25^{-5}	-108.33	-66.67
$ring_{-}5_{-}4$	$\stackrel{\circ}{\mathrm{d}\mathrm{j}}$	79	17	60	18	18	70	0	69	37	23	66.67	37.84
$ring_5_4$	graphstate	100	22	45	18	33	26.67	-83.33	59	27	24	59.32	11.11
$ring_5_4$	wstate	163	90	0	3	45	nan	-1400	90	93	60	33.33	35.48
$ring_5_4$	vqe	168	26	0	3	51	nan	-1600	26	35	35	-34.62	0
$ring_5_4$	qaoa	190	34	117	15	69	41.03	-360	191	50	60	68.59	-20
$ring_5_4$	qft	270	78	336	123	nan	nan	nan	258	172	nan	nan	nan
$ring_5_4$	qftentangled	282	82	336	144	195	41.96	-35.42	262	214	137	47.71	35.98
ring_5_4	realamprandom	335	57	852	318	nan	nan	nan	624	327	nan	nan	nan
ring_5_4	twolocalrandom	335	57	852	351	nan	nan	nan	624	343	nan	nan	nan
ring_5_4	su2random	$375 \\ 459$	61 108	$852 \\ 603$	$\frac{339}{255}$	nan	nan	nan	$646 \\ 538$	$\frac{346}{312}$	nan	nan	nan
ring_5_4 ring_5_4	qnn portfolioqaoa	612	108 132	852	$\frac{255}{321}$	nan nan	nan nan	nan	558 796	$\frac{312}{476}$	nan nan	nan	nan
ring_5_4 ring_5_4	random	646	152 155	$\frac{378}{378}$	$\frac{321}{237}$	nan	nan	nan nan	547	409	nan	nan nan	nan nan
ring_5_4	portfoliovqe	1145	217	852	$\frac{237}{387}$	nan	nan	nan	894	574	nan	nan	nan
t_horizontal_5_4	ghz	12	12	18	9	18	0	-100	30	18	17	43.33	5.56
$t_{horizontal_5_4}$	dj	79	17	150	21	15	90	28.57	88	47	26	70.45	44.68
$t_{horizontal_5_4}$	graphstate	100	22	54	18	54	0	-200	53	29	32	39.62	-10.34
$t_{-}horizontal_{-}5_{-}4$	wstate	163	90	45	0	24	46.67	nan	116	90	78	32.76	13.33
$t_{horizontal_5_4}$	vqe	168	26	51	3	30	41.18	-900	71	35	37	47.89	-5.71
$t_{-}horizontal_{-}5_{-}4$	qaoa	190	34	129	24	114	11.63	-375	206	53	64	68.93	-20.75
t_horizontal_5_4	qft	270	78	486	162	195	59.88	-20.37	331	177	106	67.98	40.11
t_horizontal_5_4	qftentangled	282	82	510	150	195	61.76	-30	313	185	110	64.86	40.54
t_horizontal_5_4	realamprandom	335	57	1614	366	414	74.35	-13.11	840	270	143	82.98	47.04
t_horizontal_5_4	twolocalrandom	335	57	1614	360	414	74.35	-15	840	268	143	82.98	46.64
t_horizontal_5_4 t_horizontal_5_4	su2random	$375 \\ 459$	61 108	$1614 \\ 1056$	$\frac{381}{264}$	$414 \\ 402$	74.35 61.93	-8.66 -52.27	$868 \\ 662$	271 288	147 194	83.06 70.69	$45.76 \\ 32.64$
t_horizontal_5_4	qnn portfolioqaoa	615	132	1614	$\frac{204}{360}$	402	69.7	-32.27 -35.83	979	380	$\frac{194}{238}$	75.69	37.37
t_horizontal_5_4	random	646	152 155	522	279	402	22.99	-33.83 -44.09	660	345	$\frac{230}{231}$	65	33.04
t_horizontal_5_4	portfoliovqe	1145	217	1614	372	441	72.68	-18.55	1001	424	$\frac{231}{276}$	72.43	34.91
t_vertical_5_4	ghz	12	12	27	6	30	-11.11	-400	39	18	19	51.28	-5.56
$t_{vertical_5_4}$	$\mathrm{d}\mathrm{j}$	79	17	135	18	15	88.89	16.67	85	51	25	70.59	50.98
$t_{vertical_5_4}$	graphstate	100	22	57	15	48	15.79	-220	59	26	29	50.85	-11.54
$t_{vertical_5_4}$	wstate	163	90	72	3	45	37.5	-1400	137	93	66	51.82	29.03
$t_{vertical_5_4}$	vqe	168	26	66	0	51	22.73	nan	73	26	38	47.95	-46.15
$t_{vertical_5_4}$	qaoa	190	34	114	21	111	2.63	-428.57	196	53	60	69.39	-13.21
$t_{vertical_5_4}$	qft	270	78	498	138	195	60.84	-41.3	273	195	106	61.17	45.64
$t_{\text{vertical}}_{-5}_{-4}$	qftentangled	282	82	510	150	195	61.76	-30	309	198	110	64.4	44.44
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	realamprandom	335	57	1515	378	447	70.5	-18.25	835	304	154	81.56	49.34
t_vertical_5_4	twolocalrandom	335	57	1515	384	447	70.5	-16.41	835	287	154	81.56	46.34
t_vertical_5_4	su2random	375 450	61	1515	429	447	70.5	-4.2	863	374	160	81.46	57.22
t_vertical_5_4	qnn	459 615	108	1002	249	423	57.78	-69.88	662	258	204	69.18	20.93
t_vertical_5_4 t_vertical_5_4	portfolioqaoa random	$615 \\ 646$	$\frac{132}{155}$	$1515 \\ 525$	$\frac{354}{270}$	504 381	66.73 27.43	-42.37 -41.11	$976 \\ 710$	$394 \\ 344$	$\frac{255}{228}$	73.87 67.89	$35.28 \\ 33.72$
t_vertical_5_4 t_vertical_5_4	random portfoliovqe	$\frac{646}{1145}$	$\frac{155}{217}$	$\frac{525}{1515}$	366	$\frac{381}{507}$	66.53	-41.11 -38.52	997	508	228 282	67.89 71.72	33.72 44.49
line_1_20	ghz	1143 12	$\frac{217}{12}$	1919	30	27	nan	-36.52 10	12	36	262 15	-25	58.33
line_1_20	dj	79	17	216	27	21	90.28	22.22	94	51	30	68.09	41.18
line_1_20	graphstate	100	22	66	18	42	36.36	-133.33	56	31	29	48.21	6.45
	0r	-50											

Table 2: Additional swap gates and circuit depth, $n=10\,$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
$line_1_20$	wstate	163	90	0	0	27	nan	nan	90	90	76	15.56	15.56
$line_1_20$	vqe	168	26	0	0	27	nan	nan	26	26	33	-26.92	-26.92
$line_1_20$	qaoa	190	34	168	30	75	55.36	-150	228	53	44	80.7	16.98
$line_1_20$	qft	270	78	780	168	195	75	-16.07	342	184	106	69.01	42.39
$line_1_20$	qftentangled	282	82	780	195	195	75	0	346	214	110	68.21	48.6
$line_1_20$	realamprandom	335	57	2160	372	396	81.67	-6.45	876	272	112	87.21	58.82
$line_1_20$	two local random	335	57	2160	360	396	81.67	-10	876	268	112	87.21	58.21
$line_1_20$	su2random	375	61	2160	360	396	81.67	-10	904	291	116	87.17	60.14
$line_1_20$	qnn	459	108	1440	258	327	77.29	-26.74	657	296	155	76.41	47.64
$line_1_20$	portfolioqaoa	615	132	2160	360	408	81.11	-13.33	985	380	176	82.13	53.68
$line_1_20$	random	646	155	582	312	435	25.26	-39.42	708	404	225	68.22	44.31
$line_1_20$	portfoliovqe	1145	217	2160	360	408	81.11	-13.33	1007	402	255	74.68	36.57

Table 3: Additional swap gates and circuit depth, $n\,=\,15$

	layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
Mill 20.1 Graphstate 150 62 03 0 0 0 0 0 0 0 0	full_20_1	ghz	17	17	0	0	0	nan	nan	17	17	17	0	0
Full Dall Vege	$full_20_1$	_	118	22	0	0	0	nan	nan	22	22	22	0	0
Mill Mill	$full_20_1$	graphstate	150	26	0	0	0	nan	nan	26	26	26	0	0
Mill 20.1 QR	$full_20_1$	vqe	253	31	0	0	0	nan	nan	31	31	31	0	0
		wstate			0	0	0	nan	nan				0	0
Mill 20.1 Open					0	0		nan	nan				0	0
Final 20		-						nan	nan					
		•						nan	nan					
Mill 20.1		-						nan	nan					
Mill 20.1														
Full 20.1		*												-
Full.10.2 ghz portfolioque 2505 327 0 0 0 0 0 0 0 0 0		• •												-
full 10.2 giz 17 7 0 12 0 nan 100 17 23 17 0 20 20 11 22 66 6 6 86.36 -50 95 22 90 49.12 -11.54 full 10.2 westace 253 31 0 6 0 nan 100 31 40 31 0 22.5 full 10.2 qsoa 255 34 63 6 69 -9.52 -1050 164 46 26 60,37 24.1 11.1 11.1 11.1 11.1 11.1 11.1 11.1 11.1 11.1 12.1 11.1 11.1 12.1 11.1 12.1 11.1 12.1 11.1 12.1 11.1 12.1 11.1 12.2 11.1 12.2 11.1 12.2 12.1 12.1 12.2 12.1 12.2 12.2 12.2 12.2 12.2 12.2 12.2														-
full.10.2 dj 11.8 22 66 6 9 8.63.6 -50 95 2.7 29 69.47 -7.11.54 full.10.2 cyog 253 3.3 0 6 0 nam 100 3.3 135 0 2.25 full.10.2 qoan 285 34 63 6 9 9.02 -1000 135 138 135 0 2.25 full.10.2 qftentaugled 699 118 378 48 321 15.08 -368.75 485 307 241 50.31 2.25 full.10.2 qftentaugled 695 77 146 168 315 72.51 8-75 139 401 21 84.99 45.53 4133 429 215 48.94 411 43.04 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.1 43.2<		•												
		_											-	
full 10 2 westate 223 31 0 6 0 nan 100 31 40 31 0 22.5 full 10 2 qaoa 285 34 63 6 9 -9.52 -1050 164 62 65 60.37 -4.84 full 10 2 qftentaagled 681 122 378 72 321 15.08 -568.75 485 307 241 50.31 21.5 full 10 2 qeralamprandom 615 77 1146 168 315 72.51 87.5 1399 401 210 84.99 47.63 full 10.2 qmn 914 158 720 69 369 48.75 434.78 1103 430 202 72.52 9.97 full 10.2 qmn 914 158 720 99 468 48.9 430 402 434 81 122 50 55 49.88 full 10.2 qmn		*												
full.10.2 wstate 23 135 0 6 0 nan 100 135 135 0 2.17 full.10.2 qfa 581 118 378 48 321 15.08 -568.75 483 307 241 50.31 21.5 full.10.2 qftentangled 608 122 378 72 321 15.08 -348.83 489 329 245 49.99 25.53 full.10.2 tendeamprandom 675 81 1146 168 315 72.51 87.5 1399 401 21 84.99 46.84 full.10.2 qnn 91 158 720 69 360 48.75 -43.78 130 430 30 72.62 29.75 full.10.2 qnn 914 158 720 69 360 48.75 -43.78 130 40 22.5 54.83 full.10.2 portfolioqaoa 250 327		~ -												
full_10_2 qaoa 285 34 63 69 9-52 -105 164 62 65 67.37 -4.84 full_10_2 qftentangled 608 122 378 72 321 15.08 -34.58 348 329 245 59.99 25.53 full_10_2 twolocalrandom 615 77 1146 168 315 72.51 -87.5 1399 401 210 84.99 47.63 full_10_2 twolocalrandom 615 77 1146 168 315 72.51 -87.5 1399 401 210 84.98 46.84 full_10_2 401 188 140 810 318 140 810 81.98 48.04 81.01 81.02 21.75 71.76 74.73 31.5 8.02 29.77 41.11 120 90 90 90 66.67 23.33 35 23 25 28.57 8.74 8.11 8.22 90 40.22 </td <td></td>														
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	~		1992	412	2127	1050	1407	33.85	-34	2042	1105	580	71.6	47.51
	$\rm ring_10_2$	portfoliovqe	2505	327	5427	1125	1593	70.65	-41.6	2195	1049	536	75.58	48.9
	full_7_3	ghz	17	17	0	18	0	nan	100	17	23	17	0	26.09

Table 3: Additional swap gates and circuit depth, $n\,=\,15$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
full_7_3 full_7_3	$rac{ ext{dj}}{ ext{graphstate}}$	118 150	22 26	96 21	15 9	$\frac{15}{27}$	84.38 -28.57	0 -200	$\begin{array}{c} 116 \\ 44 \end{array}$	41 29	30 31	74.14 29.55	26.83 -6.9
full_7_3	vqe	253	31	0	12	0	-28.57 nan	100	31	58	31	0	$\frac{-0.5}{46.55}$
full_7_3	wstate	253	135	0	15	0	nan	100	135	141	135	0	4.26
full_7_3	qaoa	$\frac{285}{285}$	34	108	15	51	52.78	-240	223	56	53	76.23	5.36
$full_7_3$	qft	591	118	501	141	300	40.12	-112.77	588	313	213	63.78	31.95
$full_7_3$	qftentangled	608	122	501	105	300	40.12	-185.71	592	361	217	63.34	39.89
$full_7_3$	realamprandom	615	77	1395	414	nan	nan	nan	1456	456	nan	nan	nan
$full_7_3$	two local random	615	77	1395	438	nan	nan	nan	1456	494	nan	nan	nan
$full_7_3$	su2random	675	81	1395	414	nan	nan	nan	1499	508	nan	nan	nan
$full_7_3$	qnn	914	158	927	282	nan	nan	nan	1170	529	nan	nan	nan
full_7_3	portfolioqaoa	1260	192	1395	318	nan	nan	nan	1787	897	nan	nan	nan
full_7_3	random	1992	412	705	492	nan	nan	nan	1490	1059	nan	nan	nan
full_7_3	portfoliovqe	2505	327	1395	372	0	100	100	2112	837	327	84.52	60.93
grid_8_3	ghz	17	17	15	12	39	-160	-225	32	26	29	9.38	-11.54
grid_8_3	dj	118 150	22 26	261 63	27	21 51	$91.95 \\ 19.05$	22.22 -466.67	125 81	57 26	$\frac{40}{34}$	$68 \\ 58.02$	29.82 -30.77
$\frac{\text{grid}_{8_3}}{\text{grid}_{8_3}}$	graphstate	253	31	66	9	51	19.03 18.18	-400.07 -500	80	40	34 45	43.75	-30.77 -12.5
grid_8_3	$egin{array}{c} { m vqe} \\ { m wstate} \end{array}$	$\frac{253}{253}$	135	21	3	39	-85.71	-1200	147	138	99	32.65	28.26
grid_8_3	qaoa	$\frac{285}{285}$	$\frac{133}{34}$	300	33	135	55	-309.09	335	53	58	82.69	-9.43
grid_8_3	qft	591	118	1413	270	405	71.34	-50	697	254	195	72.02	23.23
grid_8_3	qftentangled	608	122	1413	285	537	62	-88.42	709	294	234	67	20.41
grid_8_3	realamprandom	615	77	4404	645	711	83.86	-10.23	1828	446	224	87.75	49.78
grid_8_3	twolocalrandom	615	77	4404	624	711	83.86	-13.94	1828	404	224	87.75	44.55
$grid_8_3$	su2random	675	81	4404	606	711	83.86	-17.33	1869	429	230	87.69	46.39
$grid_8_3$	qnn	914	158	2721	426	813	70.12	-90.85	1368	393	338	75.29	13.99
$grid_8_3$	portfolioqaoa	1260	192	4404	684	1197	72.82	-75	2050	667	430	79.02	35.53
$grid_8_3$	random	1992	412	1962	915	1257	35.93	-37.38	1954	1054	577	70.47	45.26
$grid_8_3$	portfoliovqe	2505	327	4404	720	744	83.11	-3.33	2212	829	429	80.61	48.25
$ring_{-7}$	ghz	17	17	0	39	84	nan	-115.38	17	50	28	-64.71	44
$ring_{-7}$	dj	118	22	168	51	42	75	17.65	116	73	29	75	60.27
$ring_{-7-3}$	graphstate	150	26	54	24	90	-66.67	-275	61	35	36	40.98	-2.86
ring_7_3	$egin{array}{c} { m vqe} \\ { m wstate} \end{array}$	$253 \\ 253$	31 135	0	$\frac{30}{27}$	nan 108	nan	nan -300	$\frac{31}{135}$	70 150	nan 81	nan 40	$ \begin{array}{c} \text{nan} \\ 46 \end{array} $
$\frac{1}{100}$ $\frac{7.3}{100}$	qaoa	$\frac{255}{285}$	$\frac{135}{34}$	228	$\frac{27}{42}$	177	$\begin{array}{c} \text{nan} \\ 22.37 \end{array}$	-300 -321.43	$\frac{133}{267}$	65	71	73.41	-9.23
$ring_7_3$	qft	591	118	1158	333	nan	nan	nan	633	380	nan	nan	nan
ring_7_3	qftentangled	608	122	1158	366	nan	nan	nan	637	407	nan	nan	nan
ring_7_3	realamprandom	615	77	2679	963	1224	54.31	-27.1	1444	612	319	77.91	47.88
ring_7_3	twolocalrandom	615	77	2679	960	1224	54.31	-27.5	1444	686	319	77.91	53.5
$ring_7_3$	su2random	675	81	2679	1020	nan	nan	nan	1487	684	nan	nan	nan
$ring_{-}7_{-}3$	qnn	914	158	1920	633	nan	nan	nan	1233	540	nan	nan	nan
$ring_7_3$	portfolioqaoa	1260	192	2679	882	nan	nan	nan	1862	804	nan	nan	nan
$\operatorname{ring}_{ extsf{-}7}_{ extsf{-}3}$	random	1992	412	1737	924	nan	nan	nan	1888	1242	nan	nan	nan
$ring_7_3$	portfoliovqe	2505	327	2679	987	0	100	100	2156	1067	327	84.83	69.35
$full_5_4$	ghz	17	17	0	18	nan	nan	nan	17	32	nan	nan	nan
full_5_4	dj	118	22	114	27	9	92.11	66.67	101	61	32	68.32	47.54
full_5_4	$\operatorname{graphstate}$	150	30	63	12	36	42.86	-200	73	36	38	47.95	-5.56
full_5_4	vqe	253	31	0	15	nan	nan	nan	31	50	nan	nan	nan
full_5_4	wstate	253	135	0	15	nan	nan	nan	135	141	nan	nan	nan
full_5_4	qaoa	285	34	135	21	63	53.33	-200	242	51 216	55	77.27	-7.84
$\frac{\text{full}_{-5}_{-4}}{\text{full}_{-5}_{-4}}$	qft aftentangled	591 608	118 122	$735 \\ 735$	$\frac{162}{195}$	nan	nan	nan	$638 \\ 642$	$\frac{316}{382}$	nan	nan	nan
full_5_4 full_5_4	qftentangled realamprandom	615	$\frac{122}{77}$	2385	600	nan nan	nan	nan	1683	$\frac{382}{499}$	nan nan	nan nan	nan
full_5_4	twolocalrandom	615	77	2385	579	nan	nan nan	nan nan	1683	$499 \\ 455$	nan	nan	nan nan
full_5_4	su2random	675	81	2385	654	nan	nan	nan	1717	532	nan	nan	nan
full_5_4	qnn	914	158	1548	417	nan	nan	nan	1268	549	nan	nan	nan
full_5_4	portfolioqaoa	1260	192	2385	555	nan	nan	nan	1922	737	nan	nan	nan
full_5_4	random	1992	412	1023	711	nan	nan	nan	1646	1105	nan	nan	nan
full_5_4	portfoliovqe	2505	327	2385	624	nan	nan	nan	2078	1161	nan	nan	nan
$grid_{-}6_{-}4$	ghz	17	17	15	30	39	-160	-30	32	44	29	9.38	34.09
$grid_{-}6_{-}4$	dj	118	22	261	36	21	91.95	41.67	125	77	40	68	48.05

Table 3: Additional swap gates and circuit depth, $n\,=\,15$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
grid_6_4	graphstate	150	30	87	24	54	37.93	-125	88	34	28	68.18	17.65
grid_6_4	vqe	253	31	66	3	54	18.18	-1700	80	31	45	43.75	-45.16
$grid_{-}6_{-}4$	wstate	253	135	21	21	39	-85.71	-85.71	147	147	99	32.65	32.65
$grid_6_4$	qaoa	285	34	300	48	135	55	-181.25	335	59	58	82.69	1.69
$grid_{-}6_{-}4$	qft	591	118	1584	303	441	72.16	-45.54	709	310	197	72.21	36.45
$\operatorname{grid}_{-}6_{-}4$	qftentangled	608	122	1425	297	537	62.32	-80.81	705	288	234	66.81	18.75
$grid_6_4$	realamprandom	615	77	4404	648	711	83.86	-9.72	1828	442	224	87.75	49.32
$grid_6_4$	twolocalrandom	615	77	4404	645	711	83.86	-10.23	1828	395	224	87.75	43.29
$grid_6_4$	su2random	675	81	4404	618	711	83.86	-15.05	1869	445	230	87.69	48.31
grid_6_4	qnn	914	158	2721	450	813	70.12	-80.67	1368	448	338	75.29	24.55
grid_6_4	portfolioqaoa	1260	192	4404	597	1197	72.82	-100.5	2050	601	430	79.02	28.45
grid_6_4	random	1992	$\frac{412}{327}$	1821 4404	924 684	$1257 \\ 744$	$30.97 \\ 83.11$	-36.04	1904 2212	$1056 \\ 902$	$577 \\ 429$	$69.7 \\ 80.61$	45.36 52.44
$ grid_{-}6_{-}4 $ $ ring_{-}5_{-}4 $	portfoliovqe	$2505 \\ 17$	327 17	4404	18	744	nan	-8.77 -300	$\frac{2212}{17}$	$\frac{902}{35}$	$\frac{429}{34}$	-100	$\frac{52.44}{2.86}$
$ring_{-5}_{-4}$	$_{ m dj}^{ m ghz}$	118	22	153	36	30	80.39	-300 16.67	113	33 71	$\frac{34}{32}$	71.68	54.93
$ring_5_4$ $ring_5_4$	graphstate	150	30	93	27	78	16.13	-188.89	92	36	$\frac{32}{36}$	60.87	0
$ring_5_4$	vqe	253	31	0	18	nan	nan	nan	31	43	nan	nan	nan
$ring_5_4$	wstate	253	135	0	30	123	nan	-310	135	150	103	23.7	31.33
$ring_5_4$	qaoa	285	34	171	54	102	40.35	-88.89	250	62	48	80.8	22.58
$ring_5_4$	qft	591	118	1089	309	nan	nan	nan	609	317	nan	nan	nan
$ring_5_4$	qftentangled	608	122	1089	336	nan	nan	nan	613	387	nan	nan	nan
$ring_5_4$	realamprandom	615	77	2934	888	nan	nan	nan	1623	587	nan	nan	nan
$ring_5_4$	two local random	615	77	2934	777	nan	nan	nan	1623	495	nan	nan	nan
$ring_5_4$	su2random	675	81	2934	831	nan	nan	nan	1661	612	nan	nan	nan
$\operatorname{ring}_{-}5_{-}4$	qnn	914	158	2007	528	nan	nan	nan	1304	590	nan	nan	nan
$ring_5_4$	portfolioqaoa	1260	192	2934	765	nan	nan	nan	1933	786	nan	nan	nan
$ring_5_4$	random	1992	412	1872	927	nan	nan	nan	2089	1175	nan	nan	nan
ring_5_4	portfoliovqe	2505	327	2934	900	nan	nan	nan	2162	952	nan	nan	nan
t_horizontal_5_4 t_horizontal_5_4	ghz	17 118	17 22	$\begin{array}{c} 27 \\ 384 \end{array}$	18 33	$\frac{36}{27}$	-33.33 92.97	-100	44 137	32 70	28 40	$36.36 \\ 70.8$	$12.5 \\ 42.86$
t_horizontal_5_4	dj graphstate	150	22 26	90	33 27	21 111	-23.33	18.18 -311.11	$\frac{137}{72}$	32	$\frac{40}{42}$	41.67	-31.25
t_horizontal_5_4	vqe	253	31	63	3	51	19.05	-1600	79	40	$\frac{42}{47}$	40.51	-31.25 -17.5
t_horizontal_5_4	wstate	253	135	63	3	42	33.33	-1300	166	135	117	29.52	13.33
t_horizontal_5_4	qaoa	285	34	348	60	207	40.52	-245	337	65	66	80.42	-1.54
$t_{horizontal_5_4}$	qft	591	118	1842	420	519	71.82	-23.57	729	278	170	76.68	38.85
$t_{horizontal_5_4}$	qftentangled	608	122	1788	408	543	69.63	-33.09	698	375	177	74.64	52.8
$t_{borizontal_5_4}$	realamprandom	615	77	5859	1020	1020	82.59	0	1927	599	234	87.86	60.93
$t_horizontal_5_4$	two local random	615	77	5859	879	1020	82.59	-16.04	1927	430	234	87.86	45.58
$t_horizontal_5_4$	su2random	675	81	5859	975	1020	82.59	-4.62	1970	514	237	87.97	53.89
$t_{horizontal_5_4}$	qnn	914	158	4041	594	1065	73.65	-79.29	1458	427	355	75.65	16.86
$t_{horizontal_5_4}$	portfolioqaoa	1260	192	5859	849	1359	76.8	-60.07	2156	650	420	80.52	35.38
t_horizontal_5_4	random	1992	412	2613	1422	1815	30.54	-27.64	2408	1155	644	73.26	44.24
t_horizontal_5_4	portfoliovqe	2505	327	5859	963	1047	82.13	-8.72	2288	809	431	81.16	46.72
t_vertical_5_4 t_vertical_5_4	ghz	17 118	$\frac{17}{22}$	$\frac{45}{318}$	$\frac{15}{36}$	$\frac{54}{27}$	-20 91.51	-260 25	$62 \\ 131$	32 73	29 38	53.23 70.99	$9.38 \\ 47.95$
t_vertical_5_4	dj graphstate	150	26	78	30 24	$\frac{27}{120}$	-53.85	-400	68	39	30 49	27.94	-25.64
t_vertical_5_4	vqe	253	31	150	36	99	-95.65 34	-400 -175	94	77	48	48.94	37.66
t_vertical_5_4	wstate	$\frac{253}{253}$	135	126	15	84	33.33	-460	200	147	97	51.5	34.01
t_vertical_5_4	qaoa	285	34	336	66	171	49.11	-159.09	351	57	68	80.63	-19.3
t_vertical_5_4	qft	591	118	1680	369	615	63.39	-66.67	642	327	222	65.42	32.11
$t_{\text{vertical}}_{-5}_{-4}$	qftentangled	608	122	1764	408	621	64.8	-52.21	653	382	234	64.17	38.74
$t_{\text{-}} vertical_{\text{-}}5_{\text{-}}4$	realamprandom	615	77	5304	1044	1098	79.3	-5.17	1919	565	261	86.4	53.81
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	twolocalrandom	615	77	5304	1059	1098	79.3	-3.68	1919	596	261	86.4	56.21
$t_{vertical_5_4}$	su2random	675	81	5304	1041	1098	79.3	-5.48	1962	604	265	86.49	56.13
$t_{vertical_5_4}$	qnn	914	158	3669	618	1077	70.65	-74.27	1449	547	344	76.26	37.11
$t_{vertical_5_4}$	portfolioqaoa	1260	192	5304	822	1440	72.85	-75.18	2150	664	430	80	35.24
$t_{vertical_5_4}$	random	1992	412	2475	1239	1800	27.27	-45.28	2366	1243	658	72.19	47.06
t_vertical_5_4	portfoliovqe	2505	327	5304	1014	1251	76.41	-23.37	2280	881	456	80	48.24
line_1_20	ghz	17	17	0	27	42	nan	-55.56	17	29	20	-17.65	31.03
line_1_20	dj	118	22	546	57 27	36	93.41	36.84	146	104	45	69.18	56.73
line_1_20	graphstate	150	26	99	27	90	9.09	-233.33	72	35	38	47.22	-8.57

Table 3: Additional swap gates and circuit depth, $n\,=\,15$

layout	benchmark	g	d	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
line_1_20	vqe	253	31	0	0	42	nan	nan	31	31	43	-38.71	-38.71
$line_1_20$	wstate	253	135	0	0	42	nan	nan	135	135	121	10.37	10.37
$line_1_20$	qaoa	285	34	438	63	210	52.05	-233.33	391	53	71	81.84	-33.96
$line_1_20$	qft	591	118	2877	450	519	81.96	-15.33	742	322	170	77.09	47.2
$line_1_20$	qftentangled	608	122	2877	420	543	81.13	-29.29	746	308	177	76.27	42.53
$line_1_20$	realamprandom	615	77	8190	882	936	88.57	-6.12	1996	418	162	91.88	61.24
$line_1_20$	twolocalrandom	615	77	8190	915	936	88.57	-2.3	1996	402	162	91.88	59.7
$line_1_20$	su2random	675	81	8190	876	936	88.57	-6.85	2039	451	165	91.91	63.41
$line_1_20$	qnn	914	158	5460	591	732	86.59	-23.86	1442	431	234	83.77	45.71
$line_1_20$	portfolioqaoa	1260	192	8190	876	948	88.42	-8.22	2165	591	260	87.99	56.01
$line_1_20$	random	1992	412	3348	1545	1926	42.47	-24.66	2915	1131	656	77.5	42
$line_1_20$	portfoliovqe	2505	327	8190	876	948	88.42	-8.22	2297	655	378	83.54	42.29