benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
ghz	7	7	full_10_2	0	0	0	nan	nan	7	7	7	0	0
ghz	7	7	$full_7_3$	0	0	0	nan	nan	7	7	7	0	0
ghz	7	7	$ring_10_2$	0	3	9	nan	-200	7	10	8	-14.29	20
ghz	7	7	$ring_7_3$	0	0	9	nan	nan	7	7	8	-14.29	-14.29
ghz	7	7	$grid_9_3$	6	3	6	0	-100	13	10	8	38.46	20
ghz	7	7	$grid_4_5$	3	0	9	-200	nan	10	7	8	20	-14.29
ghz	7	7	$line_5_4$	0	9	18	nan	-100	7	13	9	-28.57	30.77
ghz	7	7	$t_{poissontal_5_4}$	9	3	6	33.33	-100	16	10	9	43.75	10
ghz	7	7	$t_{vertical_5_4}$	9	0	6	33.33	nan	16	7	9	43.75	-28.57
ghz	7	7	$ring_5_4$	0	6	9	nan	-50	7	8	8	-14.29	0
dj	36	11	$full_10_2$	0	0	0	nan	nan	11	11	11	0	0
dj	36	11	$full_7_3$	0	0	0	nan	nan	11	11	11	0	0
dj	36	11	$ring_10_2$	36	3	3	91.67	0	40	17	12	70	29.41
dj	36	11	$ring_{-}7_{-}3$	24	3	3	87.5	0	30	14	12	60	14.29
dj	36	11	$grid_9_3$	9	3	0	100	100	21	17	11	47.62	35.29
dj	36	11	$grid_4_5$	21	3	3	85.71	0	37	14	12	67.57	14.29
dj	36	11	$line_5_4$	36	6	6	83.33	0	40	17	14	65	17.65
dj	36	11	t_horizontal_5_4	24	3	3	87.5	0	37	16	12	67.57	25
dj	36	11	t_vertical_5_4	24	3	3	87.5	0	37	17	12	67.57	29.41
dj	36	11	$ring_5_4$	9	3	3	66.67	0	24	14	12	50	14.29
graphstate	50	22	full_10_2	0	3	0	nan	100	22	22	22	0	0
graphstate	50	22	full_7_3	0	6	0	nan	100	22	25	22	0	12
graphstate	50	22	ring_10_2	12	6	9	25	-50	32	25	20	37.5	20
graphstate	50	22	$ring_{-7}_{-3}$	18	6	12	33.33	-100	38	25	21	44.74	16
graphstate	50	22	grid_9_3	15	3	6	60	-100	37	32	20	45.95	37.5
graphstate	50	22	grid_4_5	18	3	9	50	-200	41	25	20	51.22	20
graphstate	50	22	line_5_4	12	9	12	0	-33.33	32	25	21	34.38	16
graphstate	50	22	t_horizontal_5_4	12	6	9	25	-50	35	25	20	42.86	20
graphstate	50	22	t_vertical_5_4	12	6	9	25	-50	35	22	20	42.86	9.09
graphstate	50	22	ring_5_4	12	6	12	0	-100	33	25	25	24.24	0
qft	71	38	full_10_2	0	0	0	nan	nan	38	38	38	0	0
qft	71	38	full_7_3	0	0	0	nan	nan	38	38	38	0	0
qft	71	38	ring_10_2	72 51	15	24	66.67	-60	92	60	42	54.35	30
qft	71 71	$\frac{38}{38}$	ring_7_3	$\frac{51}{39}$	$\frac{18}{12}$	$\begin{array}{c} 24 \\ 21 \end{array}$	52.94 46.15	-33.33	$77 \\ 74$	59 53	42	45.45	28.81
qft			grid_9_3					-75 20			41	44.59	22.64
qft qft	71 71	$\frac{38}{38}$	$grid_4_5$ $line_5_4$	$\frac{36}{72}$	$\frac{15}{24}$	$\frac{27}{24}$	$25 \\ 66.67$	-80 0	$\frac{82}{92}$	$\frac{54}{57}$	$\frac{52}{42}$	$36.59 \\ 54.35$	$\frac{3.7}{26.32}$
qft	71 71	38	t_horizontal_5_4	48	$\frac{24}{15}$	$\frac{24}{24}$	50	-60	92 82	60	42	48.78	30
	71 71	38	t_norizontar_5_4 t_vertical_5_4	48	$\frac{15}{15}$	$\frac{24}{24}$	50 50	-60	82 82	60	42	48.78	30 30
qft qft	71 71	38	ring_5_4	48 27	18	18	33.33	0	65	57	43	33.85	$\frac{30}{24.56}$
wstate	73	45	full_10_2	0	0	0	nan		45	45	45 - 45	0	0
wstate	73 73	45 - 45	full_7_3	0	0	0	nan	nan nan	45	45	$45 \\ 45$	0	0
wstate	73 73	45	ring_10_2	0	0	9	nan	nan	45	45	40	11.11	11.11
wstate	73	45	ring_7_3	0	0	9	nan	nan	45	45	40	11.11	11.11
wstate	73	45	grid_9_3	18	0	$\frac{3}{12}$	33.33	nan	54	45	41	24.07	8.89
wstate	73	45	grid_4_5	12	0	9	25	nan	51	45	40	21.57	11.11
wstate	73	45	line_5_4	0	0	15	nan	nan	45	45	33	26.67	26.67
wstate	73	45	t_horizontal_5_4	18	0	6	66.67	nan	58	45	39	32.76	13.33
wstate	73	45	t_vertical_5_4	18	0	6	66.67	nan	58	45	39	32.76	13.33
wstate	73	45	ring_5_4	nan	nan	9	nan	nan	nan	nan	39	nan	nan
qftentangled	78	42	full_10_2	0	0	0	nan	nan	42	42	42	0	0
qftentangled	78	42	full_7_3	0	6	0	nan	100	42	63	42	0	33.33
qftentangled	78	42	ring_10_2	72	21	30	58.33	-42.86	96	75	49	48.96	34.67
qftentangled	78	42	ring_7_3	51	21	30	41.18	-42.86	81	75	49	39.51	34.67
qftentangled	78	42	grid_9_3	45	21	27	40	-28.57	87	76	45	48.28	40.79
qftentangled	78	42	grid_4_5	36	18	15	58.33	16.67	78	57	45	42.31	21.05
qftentangled	78	42	line_5_4	72	24	36	50	-50	96	73	50	47.92	31.51
qftentangled	78	42	t_horizontal_5_4	60	24	33	45	-37.5	90	73	48	46.67	34.25
qftentangled	78	42	t_vertical_5_4	60	21	33	45	-57.14	90	75	48	46.67	36
1													
qftentangled	78	42	$ring_5_4$	27	21	30	-11.11	-42.86	69	76	49	28.99	35.53

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
vqe	83	21	full_7_3	0	0	0	nan	nan	21	21	21	0	0
vqe	83	21	$ring_10_2$	0	0	15	nan	nan	21	21	29	-38.1	-38.1
vqe	83	21	ring73	0	0	15	nan	nan	21	21	29	-38.1	-38.1
vqe	83	21	grid_9_3	15	0	12	20	nan	35	21	27	22.86	-28.57
vqe	83	21	$grid_4_5$	18	0	15	16.67	nan	39	21	29	25.64	-38.1
vqe	83	21	$line_5_4$	0	0	15	nan	nan	21	21	24	-14.29	-14.29
vqe	83	21	$t_{porizontal_5_4}$	12	0	12	0	nan	33	21	25	24.24	-19.05
vqe	83	21	$t_{vertical_5_4}$	12	0	12	0	nan	33	21	25	24.24	-19.05
vqe	83	21	$\operatorname{ring}_{-}5_{-}4$	0	0	15	nan	nan	21	21	29	-38.1	-38.1
qaoa	95	31	$full_10_2$	0	3	0	nan	100	31	42	31	0	26.19
qaoa	95	31	$full_7_3$	0	0	0	nan	nan	31	31	31	0	0
qaoa	95	31	$ring_10_2$	48	12	27	43.75	-125	106	47	45	57.55	4.26
qaoa	95	31	$ring_{-}7_{-}3$	24	9	27	-12.5	-200	54	58	45	16.67	22.41
qaoa	95	31	$grid_9_3$	9	9	21	-133.33	-133.33	37	48	48	-29.73	0
qaoa	95	31	$grid_4_5$	18	6	27	-50	-350	59	50	45	23.73	10
qaoa	95	31	$line_5_4$	48	12	18	62.5	-50	106	42	39	63.21	7.14
qaoa	95	31	t_horizontal_5_4	33	9	24	27.27	-166.67	100	48	45	55	6.25
qaoa	95	31	$t_{vertical_5_4}$	33	9	24	27.27	-166.67	100	48	45	55	6.25
qaoa	95	31	ring_5_4	18	9	27	-50	-200	53	39	48	9.43	-23.08
realamprandom	130	37	full_10_2	0	0	0	nan	nan	37	37	37	0	0
realamprandom	130	37	full_7_3	0	0	0	nan	nan	37	37	37	0	0
realamprandom	130	37	ring_10_2	180	51	60	66.67	-17.65	206	109	66	67.96	39.45
realamprandom	130	37	ring_7_3	120	51	60	50	-17.65	129	109	66	48.84	39.45
realamprandom	130 130	$\frac{37}{37}$	grid_9_3	96	$\begin{array}{c} 24 \\ 42 \end{array}$	42	56.25	-75 -14.29	145	89 97	64	55.86 63.12	28.09
realamprandom	130 130	37 37	$grid_4_5$ $line_5_4$	81	$\frac{42}{72}$	48 93	40.74 48.33		160	97 128	59	71.36	$39.18 \\ 53.91$
realamprandom realamprandom	130	37	t_horizontal_5_4	180 117	51	95 60	48.72	-29.17 -17.65	$\frac{206}{185}$	106	59 66	64.32	35.91 37.74
realamprandom	130	37	t_norizontar_5_4 t_vertical_5_4	117	51	60	48.72	-17.65	185	106	66	64.32	37.74
twolocalrandom	130	37	full_10_2	0	0	0	nan	nan	$\frac{165}{37}$	37	37	04.32	0
twolocalrandom	130	37	full_7_3	0	18	0	nan	100	37	81	37	0	54.32
twolocalrandom	130	37	ring_10_2	180	51	60	66.67	-17.65	206	109	66	67.96	39.45
twolocalrandom	130	37	ring_7_3	120	51	60	50	-17.65	129	112	66	48.84	41.07
twolocalrandom	130	37	grid_9_3	96	36	42	56.25	-16.67	145	93	64	55.86	31.18
twolocalrandom	130	37	grid_4_5	81	42	48	40.74	-14.29	160	101	59	63.12	41.58
twolocalrandom	130	37	$line_5_4$	180	72	93	48.33	-29.17	206	113	59	71.36	47.79
twolocalrandom	130	37	$t_{horizontal_5_4}$	117	72	60	48.72	16.67	185	126	66	64.32	47.62
two local random	130	37	$t_{vertical_5_4}$	117	48	60	48.72	-25	185	107	66	64.32	38.32
su2random	150	41	$full_10_2$	0	15	0	nan	100	41	64	41	0	35.94
su2random	150	41	$full_7_3$	0	0	0	nan	nan	41	41	41	0	0
su2random	150	41	$ring_10_2$	180	48	60	66.67	-25	219	110	70	68.04	36.36
su2random	150	41	$ring_7_3$	120	48	60	50	-25	138	115	70	49.28	39.13
su2random	150	41	$grid_9_3$	96	24	42	56.25	-75	155	96	68	56.13	29.17
su2random	150	41	$grid_{-}4_{-}5$	81	42	48	40.74	-14.29	174	106	63	63.79	40.57
su2random	150	41	$line_5_4$	180	69	93	48.33	-34.78	219	123	63	71.23	48.78
su2random	150	41	$t_horizontal_5_4$	117	48	60	48.72	-25	198	115	70	64.65	39.13
su2random	150	41	$t_{vertical_5_4}$	117	48	60	48.72	-25	198	110	70	64.65	36.36
qnn	154	58	full_10_2	0	39	0	nan	100	58	133	58	0	56.39
qnn	154	58	$full_7_3$	0	0	0	nan	nan	58	58	58	0	0
qnn	154	58	$ring_10_2$	120	39	66	45	-69.23	172	122	84	51.16	31.15
qnn	154	58	$ring_7_3$	93	36	66	29.03	-83.33	122	122	84	31.15	31.15
qnn	154	58	grid_9_3	63	30	48	23.81	-60	132	97	78	40.91	19.59
qnn	154	58	grid_4_5	54	30	54	0	-80	151	103	80	47.02	22.33
qnn	154	58	line_5_4	120	48	84 66	30	-75	172	127	80	53.49	37.01
qnn	154	58	t_horizontal_5_4	81	48	66 66	18.52	-37.5	172	127	84	51.16	33.86
qnn	154 154	58	t_vertical_5_4	81	45 26	66 66	18.52	-46.67	172	133	84	51.16	36.84
qnn	154	58 72	ring_5_4	48	36	66	-37.5	-83.33	95 72	122	84	11.58	31.15
portfoliogaoa	$\frac{195}{105}$	72 72	full_10_2 full_7_3	0	0 21	0	nan	nan 100	72 72	$72 \\ 135$	72 72	0	$0 \\ 46.67$
portfolioqaoa portfolioqaoa	$\frac{195}{195}$	$\frac{72}{72}$	ring_10_2	0 180	66	0 87	nan 51.67	-31.82	$\frac{72}{255}$	166	110	$0 \\ 56.86$	40.07 33.73
portfolioqaoa portfolioqaoa	$\frac{195}{195}$	$\frac{72}{72}$	$ring_10_2$ $ring_7_3$	$180 \\ 120$	51	87 87	$\frac{51.67}{27.5}$	-31.82 -70.59	$\frac{255}{157}$	166	110	29.94	33.73 32.93
portfolioqaoa	$195 \\ 195$	$\frac{72}{72}$	grid_9_3	96	39	69	28.12	-70.59 -76.92	199	$104 \\ 141$	$110 \\ 121$	39.94	$\frac{32.93}{14.18}$
Portionodaoa	190	14	g11u_J_J	90	Jy	09	40.14	-10.94	199	141	141	JJ.4	14.10

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

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
portfolioqaoa	195	72	$grid_4_5$	81	42	69	14.81	-64.29	220	138	104	52.73	24.64
portfolioqaoa	195	72	$line_5_4$	180	66	93	48.33	-40.91	255	166	90	64.71	45.78
portfolioqaoa	195	72	$t_{-}horizontal_{-}5_{-}4$	117	60	87	25.64	-45	252	179	110	56.35	38.55
portfolioqaoa	195	72	$t_{\text{vertical}}_{-5}_{-4}$	117	66	87	25.64	-31.82	252	166	110	56.35	33.73
random	223	97	$full_10_2$	0	12	0	nan	100	97	126	97	0	23.02
random	223	97	$full_7_3$	0	12	0	nan	100	97	123	97	0	21.14
random	223	97	$ring_10_2$	63	12	66	-4.76	-450	160	106	121	24.38	-14.15
random	223	97	$ring_7_3$	60	12	66	-10	-450	157	106	121	22.93	-14.15
random	223	97	$grid_9_3$	30	12	27	10	-125	114	106	111	2.63	-4.72
random	223	97	$grid_4_5$	39	12	27	30.77	-125	169	106	111	34.32	-4.72
random	223	97	$line_5_4$	63	12	30	52.38	-150	160	106	99	38.12	6.6
random	223	97	$t_{-}horizontal_{-}5_{-}4$	36	12	66	-83.33	-450	151	106	121	19.87	-14.15
random	223	97	$t_{\text{vertical}}_{5}_{4}$	36	12	66	-83.33	-450	151	106	121	19.87	-14.15
random	223	97	$ring_5_4$	24	12	66	-175	-450	120	106	121	-0.83	-14.15
portfoliovqe	310	107	$full_10_2$	0	0	0	nan	nan	107	107	107	0	0
portfoliovqe	310	107	$full_7_3$	0	21	0	nan	100	107	161	107	0	33.54
portfoliovqe	310	107	$ring_10_2$	180	51	93	48.33	-82.35	242	204	125	48.35	38.73
portfoliovqe	310	107	$ring_7_3$	120	48	93	22.5	-93.75	179	193	125	30.17	35.23
portfoliovqe	310	107	$grid_9_3$	96	42	57	40.62	-35.71	209	181	111	46.89	38.67
portfoliovqe	310	107	$grid_4_5$	81	39	48	40.74	-23.08	239	175	115	51.88	34.29
portfoliovqe	310	107	$line_5_4$	180	69	90	50	-30.43	242	187	126	47.93	32.62
portfoliovqe	310	107	$t_{-}horizontal_{-}5_{-}4$	117	48	93	20.51	-93.75	239	193	125	47.7	35.23
portfoliovqe	310	107	$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	117	57	93	20.51	-63.16	239	205	125	47.7	39.02

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

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
ghz	12	12	full_10_2	0	6	0	nan	100	12	15	12	0	20
ghz	12	12	$full_7_3$	0	9	0	nan	100	12	21	12	0	42.86
ghz	12	12	$ring_10_2$	0	9	36	nan	-300	12	21	17	-41.67	19.05
ghz	12	12	$ring_{-}7_{-}3$	0	15	51	nan	-240	12	24	25	-108.33	-4.17
ghz	12	12	$grid_9_3$	12	9	24	-100	-166.67	24	21	16	33.33	23.81
ghz	12	12	$grid_4_5$	6	6	24	-300	-300	18	18	16	11.11	11.11
ghz	12	12	$line_5_4$	0	9	27	nan	-200	12	21	15	-25	28.57
ghz	12	12	t_horizontal_5_4	18	0	21	-16.67	nan	30	12	17	43.33	-41.67
ghz	12	12	$t_{vertical_5_4}$	27	9	30	-11.11	-233.33	39	18	19	51.28	-5.56
ghz	12	12	ring_5_4	nan	nan	45	nan	nan	nan	nan	21	nan	nan
dj	79 70	17	full_10_2	0	3	0	nan	100	17	20	17	0	15
dj	79 70	17	full_7_3	48	9	9	81.25	0	70	26	22	68.57	15.38
dj	79 70	17	ring_10_2	78	21	24	69.23 80.95	-14.29	64	43	21	67.19	51.16
dj a:	79 79	$\begin{array}{c} 17 \\ 17 \end{array}$	ring_7_3 grid_9_3	126 90	$\begin{array}{c} 15 \\ 21 \end{array}$	24 12	80.95 86.67	-60 42.86	79 82	$\begin{array}{c} 35 \\ 46 \end{array}$	19 22	75.95 73.17	$45.71 \\ 52.17$
dj dj	79 79	$\frac{17}{17}$	grid_9_5 grid_4_5	$\frac{90}{144}$	21	18	87.5	14.29	88	44	$\frac{22}{24}$	72.73	$\frac{52.17}{45.45}$
dj	79	17	$line_5_4$	216	21	21	90.28	0	94	54	30	68.09	44.44
dj	79	17	t_horizontal_5_4	150	21	15	90.28	28.57	88	51	26	70.45	49.02
dj	79	17	t_vertical_5_4	135	30	15	88.89	50	85	49	$\frac{20}{25}$	70.49	48.98
dj	79	17	ring_5_4	nan	nan	12	nan	nan	nan	nan	23	nan	nan
graphstate	100	26	full_10_2	0	6	0	nan	100	23	30	23	0	23.33
graphstate	100	26	full_7_3	18	3	12	33.33	-300	53	$\frac{36}{24}$	23	56.6	4.17
graphstate	100	26	ring_10_2	30	12	39	-30	-225	45	28	29	35.56	-3.57
graphstate	100	26	$ring_{-7}$ -3	48	18	39	18.75	-116.67	63	33	29	53.97	12.12
graphstate	100	26	$grid_9_3$	42	15	48	-14.29	-220	57	33	26	54.39	21.21
graphstate	100	26	$grid_4_5$	51	15	36	29.41	-140	70	35	24	65.71	31.43
graphstate	100	26	$line_5_4$	72	24	57	20.83	-137.5	68	36	32	52.94	11.11
graphstate	100	26	$t_horizontal_5_4$	60	21	36	40	-71.43	66	38	23	65.15	39.47
graphstate	100	26	$t_{vertical_5_4}$	63	21	39	38.1	-85.71	76	34	24	68.42	29.41
graphstate	100	26	$\operatorname{ring}_{-}5_{-}4$	nan	nan	39	nan	nan	nan	nan	30	nan	nan
wstate	163	90	$full_10_2$	0	0	0	nan	nan	90	90	90	0	0
wstate	163	90	$full_7_3$	0	0	0	nan	nan	90	90	90	0	0
wstate	163	90	$ring_{-}10_{-}2$	0	12	48	nan	-300	90	96	62	31.11	35.42
wstate	163	90	grid_9_3	21	0	27	-28.57	nan	102	90	46	54.9	48.89
wstate	163	90	grid_4_5	24	15	42	-75	-180	96	99	65 76	32.29	34.34
wstate	163	90	line_5_4	0	0	27	nan	nan	90	90	76	15.56	15.56
wstate	$\frac{163}{163}$	90	t_horizontal_5_4	$\frac{45}{72}$	0	27	40 27 5	nan	116	90	72 66	37.93	20
wstate	163	90 90	t_vertical_5_4	0	$0 \\ 12$	$\frac{45}{45}$	37.5	nan -275	$\frac{137}{90}$	90 96	66 55	$51.82 \\ 38.89$	26.67 42.71
wstate wstate	163	90	ring_5_4 ring_7_3	0	6	66	nan nan	-275 -1000	90	96	62	31.11	35.42
	168	26	full_10_2	0	0	0	nan	nan	26	26	26	0	0
vqe vqe	168	26	full_7_3	0	0	0	nan	nan	26	26	26	0	0
vqe	168	26	ring_10_2	0	9	66	nan	-633.33	26	40	40	-53.85	0
vqe	168	26	grid_9_3	9	6	54	-500	-800	31	35	43	-38.71	-22.86
vqe	168	26	grid_4_5	36	3	45	-25	-1400	61	35	33	45.9	5.71
vqe	168	26	$line_5_4$	0	0	27	nan	nan	26	26	33	-26.92	-26.92
vqe	168	26	$t_{horizontal_5_4}$	51	0	33	35.29	nan	71	26	37	47.89	-42.31
vqe	168	26	$t_{vertical_5_4}$	66	3	51	22.73	-1600	73	35	38	47.95	-8.57
vqe	168	26	$ring_5_4$	0	15	57	nan	-280	26	38	35	-34.62	7.89
vqe	168	26	$ring_7_3$	0	0	84	nan	nan	26	26	43	-65.38	-65.38
qaoa	190	34	$grid_9_3$	63	12	78	-23.81	-550	145	56	49	66.21	12.5
qaoa	190	34	$grid_4_5$	105	21	33	68.57	-57.14	174	59	38	78.16	35.59
qaoa	190	34	$line_5_4$	168	30	75	55.36	-150	228	53	44	80.7	16.98
qaoa	190	34	$t_horizontal_5_4$	129	21	78	39.53	-271.43	206	50	50	75.73	0
qaoa	190	34	t_vertical_5_4	114	27	81	28.95	-200	196	82	56	71.43	31.71
qaoa	190	34	full_10_2	0	6	0	nan	100	34	47	34	0	27.66
qaoa	190	34	full_7_3	48	9	15	68.75	-66.67	138	48	42	69.57	12.5
qaoa	190	34	$ring_10_2$	120	24	60	50	-150	154	42	48	68.83	-14.29
								1110 00			F 0		10 75
qaoa	190	34	ring_7_3	81	18	75 70	7.41	-316.67	158	64	52	67.09	18.75
	190 190 270	34 34 78	ring_7_3 ring_5_4 full_10_2	81 117 0	18 12 18	75 72 0	7.41 38.46 nan	-316.67 -500 100	158 191 78	56 133	52 56 78	67.09 70.68 0	18.75 0 41.35

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

opt cpt 75 file 55 150 160 210 28 181 408 28 29 65 50 16 50 16 50 181 150 30 43 14 150 50 20 50 185 75 49 50 18 50 30 21 20 40 18 34 34 33 33 33 33 33 33 33 33 33 33 33 33 33 33 30 60 41 40 40 41 40 40 41 40	benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
oft 270 78 ring7.5 540 120 150 7.05 2.52 161 201 63.6 43.1 23.5 181 121 63.63 43.13 43.23 43.13 <	qft	270	78	full_7_3	168	75	150	10.71	-100	236	181	140	40.68	22.65
off 2.70 7.8 grid.4.5.5 2.70 7.8 grid.4.5.5 6.70 1.80 5.5.4 8.75 1.80 6.81 1.80 6.15 6.15 1.80 6.15 6.15 6.10 9.10 4.80 6.00 4.81 6.00 4.80 1.80	qft	270	78	$ring_10_2$	330	141	165	50	-17.02	233	205	103	55.79	49.76
off 270 78 line.5.4 59 108 195 61.54 -80.6 335 176 139 1,01 21.4 4 4 4 4 1.6 130 187 100 1.6 4				~										
off 270 78 line.54 78 108 195 59.8 2-03 31 196 109 90.98 4.64 off 270 78 t.verical.5.4 48 14 195 60.84 35.42 23 187 109 100 47.44 off 282 82 181 1.73 16 45 10.10 22.2 16 18.2 10 47.44 offectangled 282 82 ring.1.0.2 30 17 105 50 10.10 22.2 12.3 20 11 10 10 10 22.2 12.2 12.3 20 11 10 6.12 23.2 21 11.5 6.14 5.5 5.5 33 40 11 10 6.2 10.3 10 10 10 20 10 10 10 20 10 10 20 10 20 10 10 20 10 <th< td=""><td></td><td></td><td></td><td>~</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>				~										
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twolocalrandom 335 57 grid.4.5 1323 258 375 71.66 -45.35 786 254 138 82.44 45.67 twolocalrandom 335 57 line.5.4 2160 360 396 81.67 -10 876 268 112 87.21 58.21 twolocalrandom 335 57 t.vertical.5.4 1515 423 447 70.5 -5.67 835 304 154 81.56 49.34 twolocalrandom 335 57 ring.7.3 1299 417 465 61.2 -15.1 79 370 171 78.6 53.78 su2random 375 61 full.10.2 885 402 537 39.32 -33.58 53 381 224 58.75 91.75 su2random 375 61 grid.4.5 132 261 375 132 381 242 48.5 922 147 86.8 922 147	two local random	335	57	$ring_10_2$	885	405	516	41.69	-27.41	522	402	215	58.81	46.52
twolocalrandom 335 57 line.5.4 2160 360 396 81.67 -10 876 268 112 87.21 58.21 twolocalrandom 335 57 t.horizontal.5.4 1614 366 414 70.55 -1.61 80 265 143 82.98 46.04 twolocalrandom 335 57 t.horizontal.5.4 129 477 465 64.2 -1.151 799 370 171 78.6 53.78 su2random 375 61 full.10.2 0 99 0 nan 100 61 236 61 0 74.15 su2random 375 61 grid.9.3 690 273 32.2 -33.58 53 381 224 58.75 51.21 su2random 375 61 grid.9.3 690 273 32.1 51.56 619 310 157 74.64 49.35 su2random 375 61 <t< td=""><td>two local random</td><td>335</td><td>57</td><td>$grid_9_3$</td><td>690</td><td>273</td><td>321</td><td>53.48</td><td>-17.58</td><td>591</td><td>299</td><td>151</td><td>74.45</td><td>49.5</td></t<>	two local random	335	57	$grid_9_3$	690	273	321	53.48	-17.58	591	299	151	74.45	49.5
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	-	615	132	$t_{borizontal_5_4}$	1614	366	489	69.7	-33.61	979	367	238	75.69	35.15
random 646 155 full_10_2 0 93 0 nan 100 155 320 155 0 51.56	portfolioqaoa	615	132	$t_{vertical_5_4}$	1515	396	504	66.73	-27.27	976	462	255	73.87	44.81
	random	646	155	$full_10_2$	0	93	0	nan	100	155	320	155	0	51.56

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

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
random	646	155	$full_7_3$	159	111	132	16.98	-18.92	419	348	179	57.28	48.56
random	646	155	$ring_10_2$	402	237	381	5.22	-60.76	493	375	244	50.51	34.93
random	646	155	$grid_9_3$	285	171	225	21.05	-31.58	455	312	185	59.34	40.71
random	646	155	$grid_4_5$	477	186	375	21.38	-101.61	643	325	222	65.47	31.69
random	646	155	$line_5_4$	582	312	435	25.26	-39.42	708	342	225	68.22	34.21
random	646	155	t_{range}	522	273	402	22.99	-47.25	660	419	231	65	44.87
random	646	155	$t_{vertical_5_4}$	525	246	381	27.43	-54.88	710	351	228	67.89	35.04
portfoliovqe	1145	217	$grid_9_3$	690	222	387	43.91	-74.32	951	479	284	70.14	40.71
portfoliovqe	1145	217	$grid_4_5$	1323	261	342	74.15	-31.03	994	465	265	73.34	43.01
portfoliovqe	1145	217	$line_5_4$	2160	360	408	81.11	-13.33	1007	402	255	74.68	36.57
portfoliovqe	1145	217	$t_{horizontal_5_4}$	1614	366	441	72.68	-20.49	1001	444	276	72.43	37.84
portfoliovqe	1145	217	$t_{vertical_5_4}$	1515	396	507	66.53	-28.03	997	536	282	71.72	47.39
portfoliovqe	1145	217	$full_10_2$	0	15	0	nan	100	217	288	217	0	24.65
portfoliovqe	1145	217	$full_7_3$	471	105	255	45.86	-142.86	878	450	308	64.92	31.56
portfoliovqe	1145	217	$ring_{-}10_{-}2$	885	411	636	28.14	-54.74	636	588	298	53.14	49.32

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

benchmark	ď	d	layout	6.5	6.7	e -	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
	g 17		full_10_2	$\frac{s_B}{}$	$\frac{s_S}{c}$	$\frac{s_L}{s_L}$					$\frac{a_L}{17}$		
$_{ m ghz}$	17 17	17 17	full_7_3	$0 \\ 0$	6 6	0	nan nan	100 100	17 17	$\frac{20}{20}$	$\frac{17}{17}$	0	15 15
ghz	17	17	ring_10_2	0	21	111	nan	-428.57	17	$\frac{20}{26}$	40	-135.29	-53.85
ghz	17	17	grid_9_3	18	9	42	-133.33	-366.67	35	20	25	28.57	-25
$_{ m ghz}$	17	17	$grid_{-}4_{-}5$	12	18	33	-175	-83.33	29	32	25	13.79	21.88
ghz	17	17	$line_5_4$	0	12	42	nan	-250	17	23	20	-17.65	13.04
ghz	17	17	$t_horizontal_5_4$	27	39	39	-44.44	0	44	53	28	36.36	47.17
ghz	17	17	t_vertical_5_4	45	51	54	-20	-5.88	62	59	29	53.23	50.85
ghz	17 17	17	ring_5_4	0	27	51 84	nan	-88.89 -366.67	17	$\frac{41}{32}$	30	-76.47	26.83
$_{ m dj}^{ m ghz}$	118	17 22	ring_7_3 full_10_2	0 66	18 9	9	nan 86.36	-300.07 0	$\begin{array}{c} 17 \\ 95 \end{array}$	32 33	28 29	-64.71 69.47	$12.5 \\ 12.12$
dj	118	$\frac{22}{22}$	full_7_3	96	9	15	84.38	-66.67	116	36	30	74.14	16.67
dj	118	22	ring_10_2	336	33	60	82.14	-81.82	122	71	28	77.05	60.56
$ {dj}$	118	22	grid93	234	48	24	89.74	50	122	67	34	72.13	49.25
dj	118	22	$grid_{-}4_{-}5$	324	45	27	91.67	40	128	75	38	70.31	49.33
$\mathrm{d}\mathrm{j}$	118	22	$line_5_4$	546	66	36	93.41	45.45	146	102	45	69.18	55.88
dj	118	22	t_horizontal_5_4	384	42	27	92.97	35.71	137	65	40	70.8	38.46
dj	118	22	t_vertical_5_4	318	48	27	91.51	43.75	131	69	38	70.99	44.93
dj dj	118 118	$\begin{array}{c} 22 \\ 22 \end{array}$	ring_5_4 ring_7_3	$\frac{153}{168}$	$\frac{36}{39}$	$\begin{array}{c} 27 \\ 42 \end{array}$	82.35 75	25 -7.69	113 116	71 66	33 29	70.8 75	53.52 56.06
graphstate	150	29	full_10_2	30	39 6	24	20	-300	51	40	$\frac{29}{34}$	33.33	15
graphstate	150	29	full_7_3	36	9	27	$\frac{25}{25}$	-200	67	35	32	52.24	8.57
graphstate	150	29	ring_10_2	111	27	108	2.7	-300	84	32	31	63.1	3.12
graphstate	150	29	$grid_{-}9_{-}3$	108	30	87	19.44	-190	86	38	33	61.63	13.16
graphstate	150	29	$grid_4_5$	147	24	111	24.49	-362.5	94	31	38	59.57	-22.58
graphstate	150	29	line_5_4	186	36	138	25.81	-283.33	95	33	49	48.42	-48.48
graphstate	150	29	t_horizontal_5_4	147	42	147	0	-250	96	37	45	53.12	-21.62
graphstate graphstate	150 150	29 29	t_vertical_5_4 ring_5_4	150 78	30 18	$\frac{138}{102}$	8 -30.77	-360 -466.67	$\frac{107}{72}$	$\frac{35}{38}$	$\frac{41}{32}$	$61.68 \\ 55.56$	-17.14 15.79
graphstate	150	29	ring_7_3	84	$\frac{10}{24}$	96	-14.29	-300	85	43	$\frac{32}{35}$	58.82	18.6
vqe	253	31	full_10_2	0	6	0	nan	100	31	41	31	0	24.39
vqe	253	31	$ring_10_2$	0	33	192	nan	-481.82	31	63	59	-90.32	6.35
vqe	253	31	$grid_9_3$	48	9	66	-37.5	-633.33	60	45	47	21.67	-4.44
vqe	253	31	$grid_4_5$	48	12	78	-62.5	-550	75	60	49	34.67	18.33
vqe	253	31	line_5_4	0	69	42	nan	39.13	31	83	43	-38.71	48.19
vqe	$253 \\ 253$	31 31	t_horizontal_5_4 t_vertical_5_4	$63 \\ 150$	$6 \\ 12$	$\frac{54}{99}$	$14.29 \\ 34$	-800 -725	79 94	$\frac{34}{54}$	47 48	40.51 48.94	-38.24 11.11
vqe vqe	$\frac{253}{253}$	31	ring_7_3	0	$\frac{12}{24}$	138	nan	-125 -475	94 31	63	53	40.94 -70.97	15.87
vqe	253	31	full_7_3	0	$\frac{24}{12}$	0	nan	100	31	56	31	0	44.64
vqe	253	31	$ring_5_4$	0	39	63	nan	-61.54	31	76	44	-41.94	42.11
wstate	253	135	$full_{-}10_{-}2$	0	12	0	nan	100	135	141	135	0	4.26
wstate	253	135	$ring_{-}10_{-}2$	0	15	177	nan	-1080	135	138	78	42.22	43.48
wstate	253	135	$grid_9_3$	57	18	72	-26.32	-300	156	147	107	31.41	27.21
wstate	253	135	grid_4_5	39	3	57	-46.15	-1800	147	138	102	30.61	26.09
wstate	253	$\frac{135}{135}$	$line_5_4$ $t_horizontal_5_4$	$0 \\ 63$	$0 \\ 21$	$\frac{42}{45}$	nan	nan 114 20	$\frac{135}{166}$	135	121 111	10.37 33.13	10.37
wstate wstate	$253 \\ 253$	135	t_norizontal_5_4 t_vertical_5_4	03 126	$\frac{21}{45}$	45 84	28.57 33.33	-114.29 -86.67	200	141 153	97	55.15 51.5	$21.28 \\ 36.6$
wstate	253	135	$ring_7_3$	0	15	108	nan	-620	135	144	81	40	43.75
wstate	253	135	full_7_3	0	12	0	nan	100	135	141	135	0	4.26
wstate	253	135	$ring_5_4$	0	48	72	nan	-50	135	150	79	41.48	47.33
qaoa	285	34	$full_10_2$	63	6	69	-9.52	-1050	164	50	65	60.37	-30
qaoa	285	34	$ring_10_2$	291	36	141	51.55	-291.67	303	54	60	80.2	-11.11
qaoa	285	34	grid_9_3	198	36	243	-22.73	-575	247	51	71	71.26	-39.22
qaoa	285	34	grid_4_5	357	39	141	60.5	-261.54	369	58	70	81.03	-20.69
qaoa	$285 \\ 285$	$\frac{34}{34}$	line_5_4 t_horizontal_5_4	$438 \\ 348$	75 54	$\frac{210}{234}$	$52.05 \\ 32.76$	-180 -333.33	$\frac{391}{337}$	56 56	71 67	81.84 80.12	-26.79 -19.64
qaoa qaoa	$\frac{285}{285}$	$\frac{34}{34}$	t_norizontal_5_4 t_vertical_5_4	$\frac{348}{336}$	$\frac{54}{63}$	$\frac{234}{234}$	32.76	-333.33 -271.43	351 351	62	89	74.64	-19.04 -43.55
qaoa qaoa	$\frac{285}{285}$	34	ring_5_4	171	51	93	45.61	-271.43 -82.35	250	83	43	82.8	48.19
qaoa	$\frac{285}{285}$	34	$ring_{-7}$ 3	228	51	177	22.37	-247.06	267	76	71	73.41	6.58
qaoa	285	34	full_7_3	108	15	51	52.78	-240	223	50	53	76.23	-6
qft	591	118	$full_10_2$	378	48	321	15.08	-568.75	485	307	241	50.31	21.5

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

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
qft	591	118	$ring_10_2$	2034	384	504	75.22	-31.25	707	389	186	73.69	52.19
qft	591	118	$grid_9_3$	1164	270	450	61.34	-66.67	680	292	203	70.15	30.48
qft	591	118	$grid_4_5$	1698	312	525	69.08	-68.27	734	324	214	70.84	33.95
qft	591	118	line_5_4	2877	426	519	81.96	-21.83	742	316	170	77.09	46.2
qft	591	118	t_horizontal_5_4	1842	381	519	71.82	-36.22	729	309	170	76.68	44.98
qft	591	118	t_vertical_5_4	1680	396	615	63.39	-55.3	642	352	222	65.42	36.93
qft	591	118	full_7_3	501	117	300	40.12	-156.41	588	295	213	63.78	27.8
qftentangled	608	122	full_10_2	378	72	321	15.08	-345.83	489	329	245	49.9	25.53
qftentangled	608	122	ring_10_2	2034	360	624	69.32	-73.33	711	344	216	69.62	37.21
qftentangled	608	122	grid_9_3	1128	279	357	68.35	-27.96	650	327	192	70.46	41.28
qftentangled	608	122	grid_4_5	1575	300	561	64.38	-87	687	315	223	67.54	29.21
qftentangled	608	122	line_5_4	2877	414	543	81.13	-31.16	746	311	177	76.27	43.09
qftentangled	608	122	t_horizontal_5_4	1788	390	543	69.63	-39.23	698	$\frac{320}{393}$	177	74.64	44.69
qftentangled	608 608	122 122	$t_{\text{-vertical}_5_4}$ full_7_3	$1764 \\ 501$	$411 \\ 150$	$621 \\ 300$	64.8 40.12	-51.09	$653 \\ 592$	393 399	$\frac{234}{217}$	64.17 63.34	40.46 45.61
qftentangled realamprandom	615	$\frac{122}{77}$	full_10_2	1146	$170 \\ 177$	315	72.51	-100 -77.97	1399	372	217	84.99	43.55
realamprandom	615	77	ring_10_2	5427	1155	1332	75.46	-11.91	1879	565	302	83.93	46.55
realamprandom	615	77	grid_9_3	3018	666	834	73.40 72.37	-15.32 -25.23	1603	439	$\frac{302}{240}$	85.03	45.33
realamprandom	615	77	grid_9_5 grid_4_5	5277	645	759	85.62	-23.23 -17.67	1840	412	198	89.24	51.94
realamprandom	615	77	line_5_4	8190	888	936	88.57	-5.41	1996	418	162	91.88	61.24
realamprandom	615	77	t_horizontal_5_4	5859	885	1020	82.59	-15.25	1927	446	234	87.86	47.53
realamprandom	615	77	t_vertical_5_4	5304	1047	1020	79.3	-4.87	1919	564	261	86.4	53.72
realamprandom	615	77	ring_7_3	2679	999	1224	54.31	-22.52	1313 1444	740	319	77.91	56.89
twolocalrandom	615	77	full_10_2	1146	138	315	72.51	-128.26	1399	327	210	84.99	35.78
twolocalrandom	615	77	ring_10_2	5427	1131	1332	75.46	-17.77	1879	601	302	83.93	49.75
twolocalrandom	615	77	grid_9_3	3018	672	834	72.37	-24.11	1603	453	240	85.03	47.02
twolocalrandom	615	77	grid_4_5	5277	696	759	85.62	-9.05	1840	446	198	89.24	55.61
twolocalrandom	615	77	line_5_4	8190	876	936	88.57	-6.85	1996	416	162	91.88	61.06
twolocalrandom	615	77	$t_{horizontal_5_4}$	5859	876	1020	82.59	-16.44	1927	424	234	87.86	44.81
twolocalrandom	615	77	$t_{vertical_5_4}$	5304	1011	1098	79.3	-8.61	1919	593	261	86.4	55.99
twolocalrandom	615	77	$ring_7_3$	2679	882	1224	54.31	-38.78	1444	595	319	77.91	46.39
su2random	675	81	full_10_2	1146	189	315	72.51	-66.67	1433	452	215	85	52.43
su2random	675	81	$ring_10_2$	5427	1155	1338	75.35	-15.84	1922	661	305	84.13	53.86
su2random	675	81	$grid_{-}9_{-}3$	3018	672	831	72.47	-23.66	1641	489	242	85.25	50.51
su2random	675	81	$grid_4_5$	5277	672	759	85.62	-12.95	1881	422	202	89.26	52.13
su2random	675	81	$line_5_4$	8190	897	936	88.57	-4.35	2039	461	165	91.91	64.21
su2random	675	81	$t_horizontal_5_4$	5859	993	1020	82.59	-2.72	1970	538	237	87.97	55.95
su2random	675	81	$t_{vertical_5_4}$	5304	1086	1098	79.3	-1.1	1962	658	265	86.49	59.73
qnn	914	158	$full_10_2$	720	90	369	48.75	-310	1103	527	302	72.62	42.69
qnn	914	158	$\operatorname{ring}_{-}10_{-}2$	3576	708	1116	68.79	-57.63	1356	558	349	74.26	37.46
qnn	914	158	$grid_9_3$	2061	444	771	62.59	-73.65	1277	456	343	73.14	24.78
qnn	914	158	$grid_4_5$	3384	447	858	74.65	-91.95	1386	414	355	74.39	14.25
qnn	914	158	$line_5_4$	5460	591	732	86.59	-23.86	1442	431	234	83.77	45.71
qnn	914	158	$t_{nizontal_5_4}$	4041	606	1065	73.65	-75.74	1458	481	355	75.65	26.2
qnn	914	158	$t_{vertical_5_4}$	3669	600	1077	70.65	-79.5	1449	509	344	76.26	32.42
portfolioqaoa	1260	192	full_10_2	1146	141	393	65.71	-178.72	1766	777	351	80.12	54.83
portfolioqaoa	1260	192	$ring_10_2$	5427	1065	1701	68.66	-59.72	2060	793	534	74.08	32.66
portfolioqaoa	1260	192	$grid_9_3$	3018	663	1074	64.41	-61.99	1843	655	412	77.65	37.1
portfolioqaoa	1260	192	$grid_4_5$	5277	663	1170	77.83	-76.47	2077	585	418	79.87	28.55
portfolioqaoa	1260	192	line_5_4	8190	888	948	88.42	-6.76	2165	531	260	87.99	51.04
portfolioqaoa	1260	192	t_horizontal_5_4	5859	822	1359	76.8	-65.33	2156	636	420	80.52	33.96
portfolioqaoa	1260	192	t_vertical_5_4	5304	879	1440	72.85	-63.82	2150	641	430	80	32.92
random	1992	412	full_10_2	534	246	597	-11.8	-142.68	1200	957	529	55.92	44.72
random	1992	412	ring_10_2	2127	1050	1407	33.85	-34	2042	1129	580	71.6	48.63
random	1992	412	grid_9_3	1647	783	1140	30.78	-45.59	1913	1177	576	69.89	51.06
random	1992	412	grid_4_5	2250	1041	1533	31.87	-47.26	2103	1056	629	70.09	40.44
random	1992	412	line_5_4	3348	1623	1926	42.47	-18.67	2915	1128	656	77.5	41.84
random	1992	412	t_horizontal_5_4	2613	1407	1815	30.54	-29	2408	1130	644	73.26	43.01
random	1992	412	t_vertical_5_4	2475	1203	1800	27.27	-49.63	2366	1214	658	72.19	45.8
	75115	327	$full_10_2$	1146	189	534	53.4	-182.54	1903	984	504	73.52	48.78
portfoliovqe portfoliovqe	$2505 \\ 2505$	327	ring_10_2	5427	1098	1590	70.7	-44.81	2195	1030	520	76.31	49.51

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

benchmark	g	d	layout	s_B	s_S	s_L	Δs_B	Δs_S	d_B	d_S	d_L	Δd_B	Δd_S
portfoliovqe	2505	327	grid_9_3	3018	636	1107	63.32	-74.06	2112	835	471	77.7	43.59
portfoliovqe	2505	327	$grid_4_5$	5277	648	768	85.45	-18.52	2244	756	412	81.64	45.5
portfoliovqe	2505	327	$line_5_4$	8190	891	948	88.42	-6.4	2297	695	378	83.54	45.61
portfoliovqe	2505	327	$t_{-}horizontal_{-}5_{-}4$	5859	975	1047	82.13	-7.38	2288	893	431	81.16	51.74
portfoliovqe	2505	327	$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	5304	942	1251	76.41	-32.8	2280	834	456	80	45.32