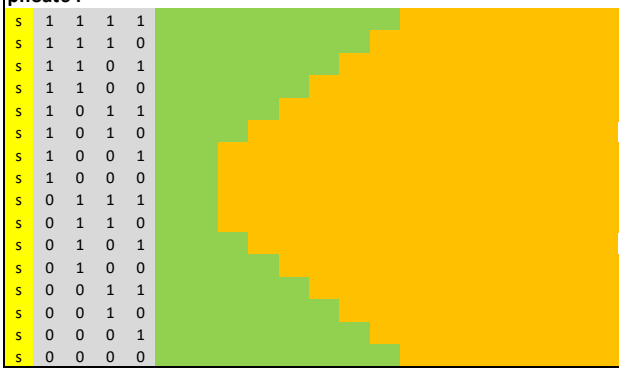
Overview: pfloat16, pfloat32, pflaot64

Legend: s : Sign bit : Range bits :Exponent bits : Mantissa bits

pfloat64

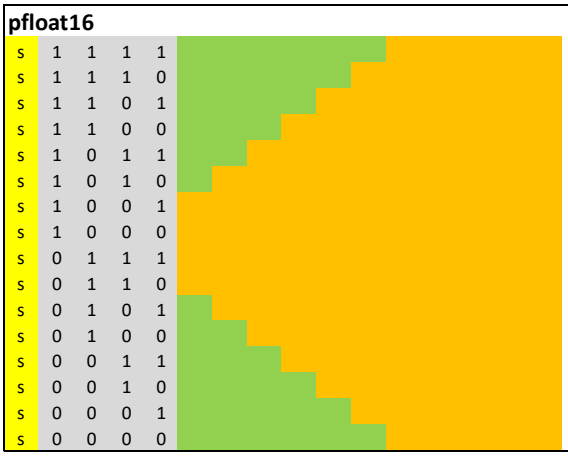


					Binary buckets	Mantissa bits	Range bias
s	1	1	1	1	256	55	2^257
s	1	1	1	0	128	52	2^129
s	1	1	0	1	64	53	2^65
s	1	1	0	0	32	54	2^33
s	1	0	1	1	16	55	2^17
s	1	0	1	0	8	56	2^9
s	1	0	0	1	4	57	2^5
s	1	0	0	0	4	57	2^1
s	0	1	1	1	4	57	2^3
s	0	1	1	0	4	57	2^-7
s	0	1	0	1	8	56	2^-15
s	0	1	0	0	16	55	2^-31
s	0	0	1	1	32	54	2^-63
s	0	0	1	0	64	53	2^-127
s	0	0	0	1	128	52	2^-255
s	0	0	0	0	256	51	2^-511

pfloat32

					Binary buckets	Mantissa bits	Range bias
s	1	1	1	1	128	20	2^129
s	1	1	1	0	64	21	2^65
s	1	1	0	1	32	22	2^33
s	1	1	0	0	16	23	2^17
s	1	0	1	1	8	24	2^9
s	1	0	1	0	4	25	2^5
s	1	0	0	1	2	26	2^3
s	1	0	0	0	2	26	2^1
s	0	1	1	1	2	26	2^-1
s	0	1	1	0	2	26	2^-3
s	0	1	0	1	4	25	2^-7
s	0	1	0	0	8	24	2^-15
s	0	0	1	1	16	23	2^-31
s	0	0	1	0	32	22	2^-63
s	0	0	0	1	64	21	2^-127
s	0	0	0	0	128	20	2^-255

pfloat16



					Binary buckets	Mantissa bits	Range bias
s	1	1	1	1	64	5	2^65
s	1	1	1	0	32	6	2^33
s	1	1	0	1	16	7	2^17
s	1	1	0	0	8	8	2^9
s	1	0	1	1	4	9	2^5
s	1	0	1	0	2	10	2^3
s	1	0	0	1	1	11	2^2
s	1	0	0	0	1	11	2^1
s	0	1	1	1	1	11	2^0
s	0	1	1	0	1	11	2^-1
s	0	1	0	1	2	10	2^-3
s	0	1	0	0	4	9	2^-7
s	0	0	1	1	8	8	2^-15
s	0	0	1	0	16	7	2^-31
s	0	0	0	1	32	6	2^-63
s	0	0	0	0	64	5	2^-127

pfloat16

										Range exponent adder	Resulting bias	Range bias adder	Mantissa bits 16
S		15	1	1	1	1	1	1	inf and nan	63	255		5
			1	1	1	1	1	0	2^127	62	254		5
			1	1	1	1	0	1	2^126	61	253		5
													5
			0	0	0	0	1	0	2^67	2	194		5
			0	0	0	0	0	1	2^66	1	193		5
			0	0	0	0	0	0	2^65	0	192	192	5
		14	1	1	1	1	1		2^64	31	191		6
			1	1	1	1	0		2^63	30	190		6
			1	1	1	0	1		2^62	29	189		6
													6
			0	0	0	1	0		2^35	2	162		6
			0	0	0	0	1		2^34	1	161		6
			0	0	0	0	0		2^33	0	160	160	6
		13	1	1	1	1			2^32	15	159		7
			1	1	1	0			2^31	14	158		7
			1	1	0	1			2^30	13	157		7
													7
			0	0	1	0			2^19	2	146		7
			0	0	0	1			2^18	1	145		7
			0	0	0	0			2^17	0	144	144	7
		12	1	1	1				1^16	7	143		8
			1	1	0				1^15	6	142		8
			1	0	1				1^14	5	141		8
													8
			0	1	0				1^11	2	138		8
			0	0	1				2^10	1	137		8
			0	0	0				2^9	0	136	136	8
		11	1	1					2^8	3	135		9
			1	0					2^7	2	134		9
			0	1					2^6	1	133		9
			0	0					2^5	0	132	132	9
		10	1						2^4	1	131		10
			0						2^3	0	130	130	10
		9							2^2	0	129	129	11
		8							2^1	0	128	128	11
		7							2^0	0	127	127	11
		6							2^-1	0	126	126	11
		5	1						2^-2	1	125		10
			0						2^-3	0	124	124	10
		4	1	1					2^-4	3	123		9
			1	0					2^-5	2	122		9
			0	1					2^-6	1	121		9
			0	0					2^-7	0	120	120	9
		3	1	1	1				2^-8	7	119		8
			1	1	0				2^-9	6	118		8
			1	0	1				2^-10	5	117		8
													8
			0	1	0				2^-13	2	114		8
			0	0	1				2^-14	1	113		8
			0	0	0				2^-15	0	112	112	8
		2	1	1	1	1			2^-16	15	111		7
			1	1	1	0			2^-17	14	110		7
			1	1	0	1			2^-18	13	109		7
													7
			0	0	1	0			2^-29	2	98		7
			0	0	0	1			2^-30	1	97		7
			0	0	0	0			2^-31	0	96	96	7
		1	1	1	1	1			2^-32	31	95		6
			1	1	1	1	0		2^-33	30	94		6
			1	1	1	0	1		2^-34	29	93		6
													6
			0	0	0	1	0		2^-61	2	66		6
			0	0	0	0	1		2^-62	1	65		6
			0	0	0	0	0		2^-63	0	64	64	6
		0	1	1	1	1	1	1	2^-64	63	63		5
			1	1	1	1	1	0	2^-65	62	62		5
			1	1	1	1	0	1	2^-66	61	61		5
													5
			0	0	0	0	1	0	2^-125	2	2		5
			0	0	0	0	0	1	2^-126	1	1		5
s	0	0	0	0	0	0	0	0	subnormal	0	0	0	5

Same or more mantissa bits compared to bfloat16

Same or more mantissa bits compared to bfloat16

pfloat32

											Range exponent adder	Resulting bias	Range bias adder	Mantissa bits 32
S	15	1	1	1	1	1	1	1		inf and nan	127	511		20
		1	1	1	1	1	1	0		2^255	126	510		20
		1	1	1	1	0	0	1		2^254	125	509		20
														20
		0	0	0	0	0	1	0		2^131	2	386		20
		0	0	0	0	0	0	1		2^130	1	385		20
		0	0	0	0	0	0	0		2^129	0	384	384	20
	14	1	1	1	1	1	1			2^128	63	383		21
		1	1	1	1	1	0			2^127	62	382		21
		1	1	1	0	0	1			2^126	61	381		21
														21
		0	0	0	0	1	0			2^67	2	322		21
		0	0	0	0	0	1			2^66	1	321		21
		0	0	0	0	0	0			2^65	0	320	320	21
	13	1	1	1	1	1				2^64	31	319		22
		1	1	1	1	0				2^63	30	318		22
		1	1	0	0	1				2^62	29	317		22
														22
		0	0	0	1	0				2^35	2	290		22
		0	0	0	0	1				2^34	1	289		22
		0	0	0	0	0				2^33	0	288	288	22
	12	1	1	1	1					2^32	15	287		23
		1	1	1	0					2^31	14	286		23
		1	0	0	1					2^30	13	285		23
														23
		0	0	1	0					2^19	2	274		23
		0	0	0	1					2^18	1	273		23
		0	0	0	0					2^17	0	272	272	23
	11	1	1	1						2^16	7	271		24
		1	1	0						2^15	6	270		24
		1	0	1						2^14	5	269		24
														24
														24
		0	1	0						2^11	2	266		24
		0	0	1						2^10	1	265		24
		0	0	0						2^9	0	264	264	24
	10	1	1							2^8	3	263		25
		1	0							2^7	2	262		25
		0	1							2^6	1	261		25
		0	0							2^5	0	260	260	25
	9	1								2^4	1	259		26
		0								2^3	0	258	258	26
	8	1								2^2	1	257		26
		0								2^1	0	256	256	26
	7	1								2^0	1	255		26
		0								2^1	0	254	254	26
	6	1								2^-2	1	253		26
		0								2^-3	0	252	252	26
	5	1	1							2^-4	3	251		25
		1	0							2^-5	2	250		25
		0	1							2^-6	1	249		25
		0	0							2^-7	0	248	248	25
	4	1	1	1						2^-8	7	247		24
		1	1	0						2^-9	6	246		24
		1	0	1						2^-10	5	245		24
											4	244		24
											3	243		24
		0	1	0						2^-13	2	242		24
		0	0	1						2^-14	1	241		24
		0	0	0						2^-15	0	240	240	24
	3	1	1	1	1					2^-16	15	239		23
		1	1	1	0					2^-17	14	238		23
		1	0	0	1					2^-18	13	237		23
														23
		0	0	1	0					2^-29	2	226		23
		0	0	0	1					2^-30	1	225		23
		0	0	0	0					2^-31	0	224	224	23
	2	1	1	1	1	1				2^-32	31	223		22
		1	1	1	1	0				2^-33	30	222		22
		1	1	0	0	1				2^-34	29	221		22
														22
		0	0	0	1	0				2^-61	2	194		22
		0	0	0	0	1				2^-62	1	193		22
		0	0	0	0	0				2^-63	0	192	192	22
	1	1	1	1	1	1	1			2^-64	63	191		21
		1	1	1	1	1	0			2^-65	62	190		21
		1	1	1	0	0	1			2^-67	61	189		21
														21
		0	0	0	0	1	0			2^-125	2	130		21
		0	0	0	0	0	1			2^-126	1	129		21
		0	0	0	0	0	0			2^-127	0	128	128	21
	0	1	1	1	1	1	1	1		2^-128	127	127		20
		1	1	1	1	1	1	0		2^-129	126	126		20
		1	1	1	1	0	0	1		2^-130	125	125		20
														20
		0	0	0	0	0	1	0		2^-253	2	2		20
		0	0	0	0	0	0	1		2^-254	1	1		20
s	0 0 0 0	0	0	0	0	0	0	0	0	subnormal	0	0	0	20

Same or more mantissa bits compared to float

Same or more mantissa bits compared to float

pfloat64

												Range exponent adder	Resulting bias	Range bias adder	Mantissa bits 64	
S		15	1	1	1	1	1	1	1	1	inf and nan	255	895		51	
			1	1	1	1	1	1	1	0	2^511	254	894		51	
			1	1	1	1	1	0	0	1	2^510	253	893		51	
															51	
			0	0	0	0	0	0	1	0	2^259	2	642		51	
			0	0	0	0	0	0	0	1	2^258	1	641		51	
			0	0	0	0	0	0	0	0	2^257	0	640	640	51	
		14	1	1	1	1	1	1	1		2^256	127	639		52	Same or more mantissa bits
			1	1	1	1	1	1	0		2^255	126	638		52	compared to double
			1	1	1	1	1	0	1		2^254	125	637		52	
															52	
			0	0	0	0	0	1	0		2^131	2	514		52	
			0	0	0	0	0	0	1		2^130	1	513		52	
			0	0	0	0	0	0	0		2^129	0	512	512	52	
		13	1	1	1	1	1	1			2^128	63	511		53	
			1	1	1	1	1	0			2^127	62	510		53	
			1	1	1	1	0	1			2^126	61	509		53	
															53	
			0	0	0	0	1	0			2^67	2	450		53	
			0	0	0	0	0	1			2^66	1	449		53	
			0	0	0	0	0	0			2^65	0	448	448	53	
		12	1	1	1	1	1				2^64	31	447		54	
			1	1	1	1	0				2^63	30	446		54	
			1	1	1	0	1				2^62	29	445		54	
															54	
			0	0	0	1	0				2^35	2	418		54	
			0	0	0	0	1				2^34	1	417		54	
			0	0	0	0	0				2^33	0	416	416	54	
		11	1	1	1	1					2^32	15	415		55	
			1	1	1	0					2^31	14	414		55	
			1	1	0	1					2^30	13	413		55	
															55	
															55	
			0	0	1	0					2^19	2	402		55	
			0	0	0	1					2^18	1	401		55	
			0	0	0	0					2^17	0	400	400	55	
		10	1	1	1						2^16	7	399		56	
			1	1	0						2^15	6	398		56	
												5			56	
			0	0	1						2^10	1	393		56	
			0	0	0						2^9	0	392	392	56	
		9	1	1							2^8	3	391		57	
			1	0							2^7	2			57	
			0	1							2^6	1			57	
			0	0							2^5	0	388	388	57	
		8	1	1							2^4	3	387		57	
			1	0							2^3	2			57	
			0	1							2^2	1			57	
			0	0							2^1	0	384	384	57	
		7	1	1							2^0	3	383		57	
			1	0							2^-1	2			57	
			0	1							2^-2	1			57	
			0	0							2^-3	0	380	380	57	
		6	1	1							2^-4	3	379		57	
			1	0							2^-5	2			57	
			0	1							2^-6	1			57	
			0	0							2^-7	0	376	376	57	
		5	1	1	1						2^-8	7	375		56	
			1	1	0						2^-9	6	374		56	
															56	
			0	0	1						2^-14	1	369		56	
			0	0	0						2^-15	0	368	368	56	
		4	1	1	1	1					2^-16	15	367		55	
			1	1	1	0					2^-17	14	366		55	
			1	1	0	1					2^-18	13	365		55	
												4	356		55	
												3	355		55	
			0	0	1	0					2^-29	2	354		55	
			0	0	0	1					2^-30	1	353		55	
			0	0	0	0					2^-31	0	352	352	55	
		3	1	1	1	1	1				2^-32	31	351		54	
			1	1	1	1	0				2^-33	30	350		54	
			1	1	1	0	1				2^-34	29	349		54	
															54	
			0	0	0	1	0				2^-61	2	322		54	
			0	0	0	0	1				2^-62	1	321		54	
			0	0	0	0	0				2^-63	0	320	320	54	
		2	1	1	1	1	1	1			2^-64	63	319		53	
			1	1	1	1	1	0			2^-163	62	318		53	
			1	1	1	1	0	1			2^-62	61	317		53	
															53	
			0	0	0	0	1	0			2^-125	2	258		53	
			0	0	0	0	0	1			2^-126	1	257		53	
			0	0	0	0	0	0			2^-127	0	256	256	53	
		1	1	1	1	1	1	1	1		2^-128	127	255		52	
			1	1	1	1	1	1	0		2^-129	126	254		52	
			1	1	1	1	1	0	1		2^-130	125	253		52	
															52	
			0	0	0	0	0	1	0		2^-253	2	130		52	
			0	0	0	0	0	0	1		2^-254	1	129		52	Same or more mantissa bits
			0	0	0	0	0	0	0		2^-255	0	128	128	52	compared to double
		0	1	1	1	1	1	1	1	1	2^-256	255	127		51	
			1	1	1	1	1	1	1	0	2^-255	254	126		51	
			1	1	1	1	1	1	0	1	2^-254	253	125		51	
															51	
			0	0	0	0	0	0	1	0	2^-509	2	2		51	
			0	0	0	0	0	0	0	1	2^-510	1	1		51	
s	0	0	0	0	0	0	0	0	0	0	subnormal	0	0	0	51	