

Student number	point total	req total	extra total	R1 Joint pos (1p)	R2 Joint rot (2p)	R3 Joint coord frame (2p)	R4 SSD (4p)	R5 normal skinning (1p)	mod	notes	SSD on GPU (2p)	animation (3p)	dual quaternion skinning (4p)	wrist joints (5p)	IK (8p)	other skinned models (5p)	other (put points here)	what other extras?
225157	0	0	0															
270034	5	5	0	1	2	2	0	0										
293846	0	0	0															
295323	0	0	0															
345642	0	0	0															
348843	0	0	0															
349936	11	9	2	1	2	2	4	0		R5: normal transformed like point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2							
350475	9.5	9.5	0	1	2	2	4	0.5		R3: two of your coord axes point to the same direction due to using the right-direction twice instead of right/up. (-0p) R5: normals not normalized.								
352091	0	0	0															
353980	0	0	0															
354439	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
355593	0	0	0															
356026	11.5	10	1.5	1	2	2	4	1		GPU SSD: normal not normalized in shader.	1.5							
361749	0	0	0															
369181	9	8	1	1	1	2	4	0		R5 + GPU SSD: normals transformed like points + not normalized.	1							
372660	0.5	0.5	0	0.5	0	0	0	0		R1: you are not using the to_parent matrices so nothing happens. use joint2.to_world = joint2.to_parent * parent_to_world instead.								
387370	0	0	0															
425575	0	0	0															
425614	11	9	2	1	2	2	3	1			2							
426419	2.5	2.5	0	1	1.5	0	0	0		R2: somewhat involved way of constructing the rotation - use the library functions. Rotation of a joint also moves the joint slightly, which is not expected.								
427489	9	9	0	1	2	2	4	0										
428022	0	0	0															
429487	0	0	0															
430829	3	3	0	1	2	0	0	0										
457598	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
460297	0	0	0															
464772	0	0	0															
46477D	0	0	0															
46596K	0	0	0															
474199	9	9	0	1	2	2	4	0		R5: normals treated like points and not normalized.								
474322	9	9	0	1	2	2	4	0										
474458	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized.								
474898	4.5	4.5	0	0.5	2	2	0	0		R1: wrong order of multiplication of matrices parent_to_world*to_parent. Fixing this fixes R2.								
475389	0	0	0															
475813	0	0	0															
475910	11	9.5	1.5	1	2	2	4	0.5		R5: normal not normalized. GPU SSD: you don't want to be using worldToClip with the normals when light direction is in world-space. Both the vectors need to be in the same space for the inner product to make sense!	1.5							

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477329	9	9	0	1	2	1.5	4	0.5		R3: rotating a joint also affects the orientation of the children's coord systems. R5: normals not normalized.								
477811	10	10	0	1	2	2	4	1		R5: maybe a bit non-standard way of doing this, but checks out!								
478328	5	5	0	1	2	2												
478470	0	0	0															
478687	0	0	0															
479505	1	1	0	1	0	0	0	0		R1: You are not quite constructing the matrix correctly. You are not using the to_parent matrices (but rather only the translation component of those matrices). Hence it seems that R1 works since it is only translations, however since you are not actually using the to_parent matrices that get changed in R2, the rotations never get applied.								
479589	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized.								
479741	10	10	0	1	2	2	4	1										
480086	0	0	0															
480248	0	0	0															
480714	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
480798	0	0	0															
481577	9	9	0	1	2	2	4	0		R5: you are transforming directions like points + leaving result unnormalized.								
493840	11	9.5	1.5	1	2	2	4	0.5		R5 + GPU SSD: normals not normalized. Animation is completely broken - I don't really see any interpolation happening anywhere?	1.5	0						
506300	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
508285	10	9	1	1	2	2	4	0		R5 + GPU SSD: normals transformed like points, not normalized.	1							
51620U	0	0	0															
524926	5	5	0	1	2	2	0	0										
525417	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
525491	0	0	0															
525941	0	0	0															
526050	9	9	0	1	2	1.5	4	0.5		R3: you are using the rows of the orientation matrix instead of the cols, meaning your local coordinate system rotates to the opposite direction of the actual rotation. R5: normals not normalized.								
526319	5	5	0	1	2	2	0	0		R4: crashes on debug mode.								
526775	0	0	0															
527143	0	0	0															
527389	0	0	0															
528867	0	0	0															
528883	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
529196	0	0	0															
529303	0	0	0															
530185	0	0	0															
530363	0	0	0															
530619	0	0	0															
530648	0	0	0															
530868	14	9.5	4.5	1	2	2	4	0.5		R5 + GPU SSD: normal not normalized.	1.5	3						

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530981	7	7	0	1	2	2	2	0		R4: when computing toBindTransforms you are using "auto joint : joints_" which does not update the actual joints since it's not pass by reference but by value. Also, when computing the position, you use (sv.position, 0) instad of (sv.position, 1).								
540094	0	0	0															
540654	0	0	0															
544566	4	4	0	1	1	2	0	0		R2: rotations wrt angle controlled by left-right-keys causes weird warping. R3: you seem to use the up direction twice instead of up/ahead (-0p).								
549040	5	5	0	1	2	2	0	0										
549163	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized.								
55055P	14.5	9.5	5	1	2	2	4	0.5		R5: Normal transformed like position (w=1)	2	3						
552794	5	5	0	1	2	2	0	0										
552969	0	0	0															
554598	0	0	0															
563068	5	5	0	1	2	2	0	0		R3: you are using the .y -coord of each dir when adding up/ahead/right vectors to the joint positions (-0p)								
576149	0	0	0															
585716	0	0	0															
586333	11	9.5	1.5	1	2	2	4	0.5		R5: normals not normalized. GPU SSD: normals not normalized, some elements of wTB remain uninitialized which on my machine resulted in erratic ripples.	1.5							
586702	9	9	0	1	2	2	4	0										
586980	0	0	0															
587316	0	0	0															
587471	11.5	10	1.5	1	2	2	4	1		GPU SSD: normal transformed like point in shader.	1.5							
588289	9	9	0	1	2	2	4	0		R5: normals treated like points and not normalized. Also inverse-transpose of a sum of matrices may not be the sum of the inverse transposes (does not even work with scalars!) Inverting the matrix at all steps of the loop also kills any performance.								
589291	0	0	0															
589343	0	0	0															
589848	8	8	0	1	2	0.5	4	0.5		R3: bones only. R5: normals transformed like points.								
590921	0	0	0															
591904	5	5	0	1	2	2	0	0										
591946	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
592929	0	0	0															
593274	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
593847	0	0	0															
594435	0	0	0															
595926	10	10	0	1	2	2	4	1										
595997	0	0	0															
596747	0	0	0															
597429	9.5	9.5	0	1	2	2	4	0.5		R5: unnormalized normals. You don't need to call getSSDTransforms separately for each vertex. Removing this gives around 20x boost to FPS.								

[illegible]

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780058	7	7	0	1	2	2	2			R4: almost there: you're missing an inverse in computeToBindTransforms(), you also have a bug in the SSD loop where the position accumulates forever without resetting								
780346	9.5	9.5	0	1	2	2	4	0.5		R5:normal not normalized								
782917	0	0	0															
783563	0	0	0															
783709	0	0	0															
786667	0	0	0															
78708M	0	0	0															
787543	0	0	0															
787640	0	0	0															
788380	0	0	0															
788678	0	0	0															
791982	0	0	0															
795700	0	0	0															
795755	0	0	0															
796039	0	0	0															
804183	11	9.5	1.5	1	2	2	4	0.5		R5 + GPU SSD: normal not normalized.	1.5							
829155	0	0	0															
838191	0	0	0															
83873J	0	0	0															
84308F	8.5	8.5	0	1	1	2	4	0.5		R5: normals not normalized.								
84858E	0	0	0															
848754	24	9.5	14.5	1	2	2	4	0.5		General: having problems with uninitialized values in release mode. R5: normal not normalized. IK: almost impossible to control. Wrist joint: severa artifacts	2	3		3.5	6			
875170	10	8	2	1	2	0	4	1		R3: not visualizing local frame, but rather world-space coordinate axes (you need right, up, ahead from transformation matrix' columns)	2							
875251	9.5	9.5	0	1	2	2	4	0.5		R5: Normal not normalized								
875303	0	0	0															
875617	0	0	0															
876399	0	0	0															
877107	0	0	0															
877152	16.5	9.5	7	1	2	2	4	0.5		R5: Normal not normalized	2			5				
878591	16.5	9.5	7	1	2	2	4	0.5		R5: normal transformed like point (w=1)	2			5				
878627	11	9	2	1	2	2	4	0		R5: normal transformed incorrectly (using just inv instead of inv-transpose, using w=1 instead of w=0, not normalized)	2							
878889	7.5	7.5	0	1	2	0	4	0.5		R3: nothing drawn. R5: Normal not normalized								
879105	11.5	9.5	2	1	2	1.5	4	1		R3: right, up, and ahead are all found in the columns (typo?)	2							
882134	0	0	0															
885128	9.5	9.5	0	1	2	2	4	0.5		R5: Normal not normalized								
886648	10.5	9	1.5	1	2	2	4	0		R5: normal transformed like point (w=1), not normalized. Wrist: modifying weights (main challenge) not done				1.5				
889645	0	0	0															
892292	0	0	0															
898351	8.5	8.5	0	1	2	2	3	0.5		R4: position needs w=1. R5: Normal not normalized								

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