361749 369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	0 5 0 0 0 0 0 111 9.5 0 0 9.5 0	9 9.5 0 0 0 0 10 0	0 0 0 0 0 0 2 2	1	2	2	4	0 0	R5: normal transformed like point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p) R3: two of your coord axes point	2				
293846 295323 345642 348643 349936 350475 352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	0 0 0 0 0 111 9.5 0 0 9.5 0	9 9 9.5 0	0 0 0 0 2 2	1	2	2			point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
295323 345642 348843 349936 350475 352091 353980 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	9.5 0 0 111 9.5 0 0 9.5 0	9 9 9.5 0 0 9.5	0 0 0 2 2 0 0 0	1			4	0	point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
345642 348843 349936 350475 352091 353980 354439 355593 366026 367149 369181 372660 387370 425575 425614 426419 427489 428022 429487 430029 457598 460297	9.5 0 0 9.5 0 9.5 0	9.5 0 0 9.5 0 0 9.5 0	0 0 2 0 0 0	1			4	0	point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
348843 349936 350475 352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	9.5 0 0 9.5 0 11.5	9 9.5 0 0 9.5 0	0 0 0 0	1			4	0	point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
349936 350475 352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	9.5 0 0 9.5 0 11.5	9.5 0 0 9.5 0	0 0 0 0 0	1			4	0	point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
350475 352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	9.5 0 0 9.5 0	9.5 0 0 9.5 0	0 0 0	1			4	0	point (w=1), also not normalized. GPU-SSD: xform_accum needs to be zero-initialized (-0p)	2				
350475 352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	9.5 0 0 9.5 0	0 0 9.5 0	0 0 0	1										
352091 353980 354439 355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	0 0 9.5 0 11.5	0 0 9.5 0	0 0 0	1	2	2			to the same direction due to using the right-direction twice instead of right/up. (-0p) R5:					
353980 354439 355593 366026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	0 9.5 0 11.5	0 9.5 0	0	1			4	0.5	normals not normalized.					
3354439 3355593 336026 3361749 3369181 3372660 3387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	9.5 0 11.5 0	9.5 0 10	0	1										
355593 356026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	0 11.5 0	0												
356026 361749 369181 372660 387370 425575 425614 426419 427489 427489 428022 429487 430829 457598 460297	11.5	10	0		2	2	4	0.5	R5: normals not normalized.					
369181 372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	0													
372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297		0	1.5	1	2	2	4	1	GPU SSD: normal not normalized in shader.	1.5				
372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	9		0											
372660 387370 425575 425614 426419 427489 428022 429487 430829 457598 460297	9								R5 + GPU SSD: normals transformed like points + not					
387370 425575 425614 426419 427489 428022 429487 430829 457598 460297		8	1	1	1	2	4	0	normalized. R1: you are not using the to_parent matrices so nothing happens. use joint2.to_world =	1				
425614 425614 426419 427489 428022 429487 430829 457598 460297	0.5	0.5	0	0.5	0	0	0	0	joint2.to_parent * parent_to_world instead.					
125675 125614 126419 127489 128022 129487 130829 157598	0.5	0.5	0		0	0	0	0	parent_to_world instead.					
426419 426419 427489 428022 429487 430829 457598 460297														
426419 427489 428022 429487 430829 457598 460297	0	9	0		_		_			_				
427489 428022 429487 430829 457598 460297	2.5	2.5	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.	2				
428022 429487 430829 457598 460297	9	9	0					0	slightly, which is not expected.					
429487 430829 457598 460297	0	0	0			. 2	4	0						
130829 157598 160297	0													
457598 460297		0	0											
160297	3	3	0				0	0						
	9.5	9.5	0		2	2	4	0.5	R5: normals not normalized.					
	0	0	0											
164772	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.					
74322	9	9	0	1	2	2	4	0						
174458	9.5	9.5	0	1	2	2	4	0.5	R5: normal not normalized.					
									R1: wrong order of multiplication of matrices					
174898	4.5	4.5	0	0.5	2	2	0	0	parent_to_world*to_parent. Fixing this fixes R2.					
75389	0	0	0				U	U	. IAMING HINGO INC.					
475813	0	0	0											
475910	U	9.5	1.5		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				

Student				R1 Joint pos	R2 Joint rot	R3 Joint coord		R5 normal			SSD on GPU	animation	dual guaternion	wrist joints		other skinned	other (put	
number	point total	req total	extra total	(1p)	(2p)	frame (2p)	R4 SSD (4p)	skinning (1p)	mod	notes	(2p)	(3p)	skinning (4p)	(5p)	IK (8p)	models (5p)	points here)	what other extras?
										R3: rotating a joint also affects the orientation of the children's coord systems. R5: normals not								
477329	9	9	0	1	2	1.5	4	0.5		normalized. R5: maybe a bit non-standard								
477811	10	10	0	1	2	2	4	1		way of doing this, but checks out!								
478328	5	5	0	1	2	2												
478470	0	0																
478687	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								
479505	1	1	0		-					never get applied.								
479589	9.5	9.5 10								R5: normal not normalized.								
479741 480086	0				2	2	4	1										
480248	0	0																
480714	9.5	9.5			2	2	4	0.5		R5: normals not normalized.								
480798	0.0	0			_	_		0.0		Tto: Hormale Hot Hormanizou.								
481577	9	9			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					4			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					2	-	U		normalizeu.	'							
524926	5				2	2	0	0										
525417	9.5	9.5								R5: normals not normalized.								
525491	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					R4: crashes on debug mode.								
526775	0																	
527143	0	0																
527389	0																	
528867	0	0			_	_				D5: seemele see								
528883	9.5	9.5			2	2	4	0.5		R5: normals not normalized.								
529196 529303	0	0																
530185	0																	
530363	0																	
530619	0																	
530648	0																	
530868	14	9.5			2	2	4	0.5		R5 + GPU SSD: normal not normalized.	1.5	3						

Student				R1 Joint pos		R3 Joint coord		R5 normal			SSD on GPU	animation	dual quaternion	wrist joints		other skinned	other (put	
number	point total	req total	extra total	(1p)	(2p)	frame (2p)	R4 SSD (4p)	skinning (1p)	mod	notes	(2p)	(3p)	skinning (4p)	(5p)	IK (8p)	models (5p)	points here)	what other extras?
										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)								
30981	7	7	0	1	2	2 2	2	0	1	instad of (sv.position, 1).								
40094	0	0	0															
40654	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).								
49040	5	5	0	1	2	2 2	0	0	1									
49163	9.5	9.5								R5: normal not normalized.								
55055P	14.5	9.5								R5: Normal transformed like position (w=1)	2	3						
52794	5	5	0	1	2	2 2	0	0	1									
52969	0	0																
54598	0	0																
563068	5	5			2	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)								
76149	0	0			_	-				jemi podmene (op)								
85716	0	0																
586333	11	9.5	1.5	1	2	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							
86702	9	9	0	1	2	2 2	4	0										
86980	0	0	0															
87316	0	0	0															
87471	11.5	10	1.5	1	2	2 2	4	1		GPU SSD: normal transformed like point in shader.	1.5							
588289	9	9	0	1	2	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.								
39291	0	0	0															
89343	0	0	0															
39848	8	8		1	2	0.5	4	0.5		R3: bones only. R5: normals transformed like points.								
90921	0	0																
91904	5	5	0	1			0	0	1									
91946	9.5	9.5	0	1	2	2 2	4	0.5		R5: normals not normalized.								
2929	0	0	0															
3274	9.5	9.5	0	1	2	2 2	4	0.5	i	R5: normals not normalized.								
3847	0	0	0															
94435	0	0	0															
95926	10	10	0	1	2	2	4	1										
95997	0	0	0															
96747	0	0																
597429	9.5	9.5			2	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.								

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?
597623	9	9	0	1				5.17			, .,		2,17		,		, i	
97937	15	9.5	5.5	1	2	2	4	0.5		R5 + GPU SSD: normals not normalized after transformations.	1.5		4					
02851	0	0	0															
02893	9.5	9.5	0	1				0.5		R5: normals not normalized.								
03096	9.5	9.5	0	1	2	2	4	0.5		R5: normals not normalized.								
										R4: problem was caused by the uninitialized matrix sigma. Uncomment the sigma.setZero()								
03245	8.5	8.5	0	1	2	2	3.5	0		to fix. Pose capture/transfer just seems								
04095	32	10	22	1	2	2	4	1		to be really broken :(Good effort, though!	2	3	4	5	8	3		
604273	7.5	7.5	0	1	2	1.5	3	0		R3: you are using the rows of the orientation instead of the columns. Causes rotation of the local system to be inverted. R4: the loop of getSsDTransforms is broken and trasforms-vector is always empty. R5: treating directions like points, unnormalized afterwards.								
06064	9.5	9.5	0	1				0.5		R5: normals not normalized.								
08949	9.5	0	0	'		2	4	0.5		No. normals not normalized.								
09155	0	0	0															
09249	0	0	0															
12472	10	10	0	1	2	2	4	1										
12498	0	0	0							R5, SSD on GPU: normals								
12870	11	9	2	1	2	2	4	0		transformed like points (w=1), also unnormalized	2							
14577	0	0	0				-	0		also uniformalized								
14580	0	0	0															
321308	6.5	6.5	0	1	2	0	3.5	0		R2: you are not using the coordinate system given by the transform matrices at all. R4: you are using "auto joint: joints." instead of "auto8 joint: joints_" in compute ToBindTransforms, so the actual joints never get non-identity to_bind_joints - only their (discarded) copies do!								
328835	5	5	0	1				0		trieli (discarded) copies do:								
20033 3036R	0	0	0	'		2												
41922	0	0	0															
646804	8.5	8.5	0	1	2	1.5	4	0		R3: you are using the rows of the orientation matrix rather than the cols. Results in the joint coord system rotating in the opposite direction than expected. R5: treating directions as points + unnormalized result.								
										R5: unnormalized normals. Running the program in VS reduces the framerate somewhat due to profiling or whatnot even in release mode. Running the executable directly gives more- or-less the same framerate as in								
647764	9.5	9.5	0	1	2	2	4	0.5		the example.								
48530	0	0	0															
18860	0	0	0															
50191	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized								
50227	0	0	0															
50405	0	0	0		_	_	_											
50560	3	3	0	1				0		DE normal not normaline d								
50942 51527	11.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized	2							

Student	i		audua 4-4-1	R1 Joint pos		R3 Joint coord	D4 665 (4-1	R5 normal		me*	SSD on GPU	animation	dual quaternion	wrist joints		other skinned	other (put	batatha
umber	point total	req total	extra total	(1p)	(2p)	frame (2p)	R4 SSD (4p)	skinning (1p)	mod	notes R5: unnormalized normals (you	(2p)	(3p)	skinning (4p)	(5p)	IK (8p)	models (5p)	points here)	what other extras?
1585	14.5	9.5	5	1	2	2	4	0.5		did normalize in the extra at the shader though!!)	2	3						
										R5: normal transformed like								
1637	9	9	0		2	2	4	0		points (w=1), not normalized								
1789	0	0	0					0.5		D5								
2102	9.5	9.5	0		2	2	4	0.5		R5: normal not normalized								
2131	16.5	9.5	7		2	2	4	0.5		R5: normal not normalized	2			5				
12333	10.5	9.5	,	'			4	0.5		R5 + GPU SSD: unnormalized				3				
2649	11	9.5	1.5	1	2	2	4	0.5		normals.	1.5							
2898	0	0	0															
										R5: unnormalized normals. Might also be a good idea to explicitly initialize newpos and newnormal								
2937	9.5	9.5	0	1	2	2	4	0.5		to zero.								
3127	12	10	2		2	2	4	1			2							
3596	0	0	0															
3693	10	10	0		2	2	4	1										
3871	0	0	0															
3907	9.5	9.5	0					0.5		R5: unnormalized normals.								
3910	10	10	0					1										
4595	19	10	9							Nice wrists!	2			5	. 2	!		
5057	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized								
55086	14	10	4	1	2	2	4	1		Dual quaternions: could not immediately see the problem, but code looks quite reasonable.	2		2					
5109	9.5	9.5	0					0.5		R5: unnormalized normal.								
5251	0	0	0															
5264	0	0	0															
55471	10.5	8.5	2	1	2	0.5	4	1		R3: right, up, and ahead are the cols of the transformation matrix, using world space offsets doesn't work. Q: Inv-transp is more correct, but differences quite small here. SSD: accum. matrix needs to be zero-initialized (not identity)								
55691	0	0	0							1								
55853	0	0	0	0	0	0	0	0		Src folder empty								
6250	3	3	0	1	2	0	0	0										
56454	10	10	0	1	2	2	4	1										
56616	10.5	9.5	1	1	2	2	4	0.5		R5 + GPU SSD: unnormalized normals. GPU SSD: weighted_sum is uninitialized and on my machine results in completely erratic jittering	1							
57291	11.5	9.5	2	1						R5: normal not normalized	2							
7314	0	0	0															
										R5: normals transformed like								
7327	9	9	0		2	2	4	0		points + unnormalized.								
7482	0	0	0							De								
7796	9.5	9.5	0					0.5		R5: normal not normalized								
7893	9.5	9.5	0	1	2	2	4	0.5		R5: normal not normalized GPU_SSD: aWeights2, aJoints2								
9914	25	10	15	1	2	2	4	1		indexing starts at 0, not 4 (-0p)	2			5		3		
20246	44.5	0.5	F	4		2		0.5		R5 + GPU SSD: unnormalized normals. Dual quaternions: there seemed to be a sign error at getDoubleQuaternions with x,y			2.5					
0246	14.5	9.5	5		2	2	4	0.5		and z.	1.5		3.5					
60877 60893	0	0	0															
3191	0	0	0															
63272	0	0	0															

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?
665380	10	10	0	1	2	2 2	4	1		No readme, let us know if we missed any extras								
665898	9.5	9.5	0	1	2	2 2	4	0.5		R5: normal not normalized								
666172	9.5	9.5	0	1	2	2 2	4	0.5		R5: normal not normalized								
666350	12	10	2	1	2	2 2	4	1		Yup, normalizing is the right thing to do!	2							
666680	21.5	9.5	12	1	2	2 2	4	0.5		R5, GPU-SSD: normal not normalized. IK: a more rigorous approach would be to use cross products (http://www.cs.cmu. edu/~15464- s13/lectures/lecture6/IK.pdf) instead of finite differences	2			5				
										R4: getSSDTransforms unimplemented? R5: normal not								
667249	7.5	7.5	0		2	2 2	2	0.5		normalized								
67137M	0	0	0															
67627H	11.5	9.5	2		2	2 2	4	0.5		R5: normal not normalized	2							
677734	0	0	0															
678089	0	0	0															
68933B	0	0	0															
69247N	0	0	0															
700436 705570	59	10	0		2	2 2	4	1			2	3	4	5	i 14		24	Weight editor (6p), wireframe visualization (1p), several IK modes (+6), DAE loader and converter (8p), animatior blending and character control (6p)
705570	59	10	49	ı		2	4			DE: parmal not parmalized		3	4		14	,	21	Control (op)
706566	9.5	9.5	0	1	2	2 2	4	0.5		R5: normal not normalized. Funnily enough, I had to undo your std::max fix to get the code to compile								
708784	24.5	9.5	15	1	2	2 2	4	0.5		R5: normal not normalized. About workload: it is quite hard to how much time any given extra will take for a given individual. Doing IK with dual numbers is more time consuming than computing analytic derivatives (with cross products) in this specific example, and is closer to hard than medium.	2			5	i 8			
708904	0	0	0															
708920	11.5	9.5	2		2	2 2	4	0.5		R5: normal not normalized	2							
708933	0	0.0	0			_		0.0			_							
709291	9.5	9.5	0		2	2 2	4	0.5		R5: not normalized								
709628	11.5	9.5	2					0.5		R5: normal not normalized	2							
710086	9.5	9.5	0					0.5		R5: normal not normalized	_							
	2.0	2.0						0.0		R5: normal not normalized. Wrist	t							
710497	14.5	9.5	5		_		4	0.5		joint behavior strange	2			3				
710743	10	10	0	1	2	2 2	4	1		R2: typo: rotz not used (-0p)								
740076			_							R3: right, up, and ahead are the								
710976	4.5	4.5	0							cols of t, not the rows								
711182	9.5	9.5	0					0.5		R5: normal not normalized	_							
711467	20.5	9.5	11	1	2	2 2	4	0.5		R5: normal not normalized	2		4	5	1			
711551	10	10	0	1	2	2 2	4	1		For loops are allowed in GLSL shaders								
711810	0	0	0			. 2	4											
711904	0	0	0															
712550	10	10	0		2	2 2	4	1		SSD probably slow due to push_back which causes allocations (you can combine the loops and get rid of the vectors)								
712686	0	0	0			. 2	4			loops and get no or the vectors)								

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?
712819	9.5	9.5	0	1		2 2	4			R5: normal not normalized								
12958	0	0	0)														
13672	0	0	0)														
714985	7	7	0			2 2	2			R4: You need w=1 when computing newpos. You also need to use references (auto &j:joints_) or index access in computeToBindTransforms() (currently changes are discarded)								
716080	9	9	0															
										R4: using rows instead of cols (frames rotate the wrong way).								
716462	8.5	8.5	0		:	2 1	4	0.5	5	R5: not normalized								
716718	0	0	0)														
716860	12	10	2	! 1	:	2 2	4	1		GPU SSD: first line of first loop has typo. Also, result and result2 need to be zero-initialized (both CPU and GPU)	2							
717377	7	7	0	1		2 2	2			R4: to_bind_joint should not be inverted in getSSDTransforms(). Also, the position vector in computeSSD() needs w coordinate 1								
717474	0	0	0															
17513	11.5	9.5	2			2 2	4	0.5	;	R5: normal not normalized	2							
717539	0	0	0				-	0.0		. to. normal not normalized								
	0	0	0															
18020																		
18871	0	0	0															
722427	0	0	0)														
723691	9	9	0) 1	 	2 1.5	4	0.5	5	R3: right, up, and ahead are cols of T, not rows. R5: normal not normalized	3							
723905	0	0	0)														
										Wrist joint shrinks when rotated,								
728667	15.5	10	5.5	i 1	· :	2 2	4	1		behaves a bit strangely	2			3.5				
728900	11.5	9.5	2	! 1		2 2	4	0.5	i	R5: normal not normalized	2							
										R5: normal transformed like								
729132	9	9	0	1	:	2 2	4	C)	point (w=1), not normalized								
729967	4.5	4.5	0		:	2 1.5				R3: Right, up, and out are the cols of T, not the rows								
30309	0	0	0															
32080	0	0	0															
32255	0	0	0															
32323	0	0	0															
32336	0	0	0															
32352	0	0	0															
732459	18.5	10	8.5	i 1		2 2	4	1		Remember to normalize normal in GPU-SSD too. Severe artifacts in wrist joints	2	3	3	3.5				
										GPU SSD: normal not								
76509T	15.5	10	5.5					1		normalized.	1.5		4					
65510	19	10	9	1	:	2 2	4	1			2	3	3 4	l .				
66331	0	0	0															
67042	0	0	0															
67136	8.5	8.5	0) 1	:	2 1	4	0.5	5	R3: right, up, and ahead computed correctly but not used. R5: normal not normalized								
768504	0	0	0															
69396	12	10	2			2 2	4	1			2							
7388B	9.5	9.5	0			2 2				R5: normal not normalized.								
7300B 779124	9.5	9.5	0				4	0.5	,	No. normal not normalized.								

Student				R1 Joint pos	R2 Joint rot	R3 Joint coord		R5 normal			SSD on GPU	animation	dual quaternion	wrist joints		other skinned	other (put	
number	point total	req total	extra total	(1p)	(2p)	frame (2p)	R4 SSD (4p)	skinning (1p)	mod	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	(2p)	(3p)	dual quaternion skinning (4p)	(5p)	IK (8p)	models (5p)	points here)	what other extras?
780058	7	7	0	1	2					resetting								
80346	9.5	9.5	0	1	2	2 2	4	0.5	i	R5:normal not normalized								
32917	0	0	0															
83563	0	0	0															
83709	0	0	0															
36667	0	0	0															
3708M	0	0	0															
87543	0	0	0															
87640	0	0	0															
38380	0	0	0															
88678	0	0	0															
91982	0	0	0															
95700	0	0	0															
95755	0	0	0															
96039	0	0	0							D# . OBU 00B .								
04183	11	9.5	1.5	1	2	2 2	4	0.5	;	R5 + GPU SSD: normal not normalized.	1.5							
29155	0	0	0			. 2	-	0.0	'	normanzed.	1.5							
38191	0	0	0															
3873J	0	0	0															
1308F	8.5	8.5	0		1	2	4	0.5		R5: normals not normalized.								
1858E	0.5	0.5	0				-	0.0	'	No. Hormais not normalized.								
48754	24	9.5	14.5	1	2	2 2	4	0.5	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	i		
75170	10	8	2	1	2	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							
75251	9.5	9.5	0	1	2	2 2	4	0.5	i	R5: Normal not normalized								
5303	0	0	0															
5617	0	0	0															
6399	0	0	0															
7107	0	0	0															
77152	16.5	9.5	7	1	2	2 2	4	0.5	5	R5: Normal not normalized	2			5				
78591	16.5	9.5	7							R5: normal transformed like point (w=1)	2			5				
78627	11	9	2	1	2	2 2	4	0		R5: normal transformed incorrectly (using just inv instead of inv-transpose, using w=1	2							
78889	7.5	7.5	0							instead of w=0, not normalized) R3: nothing drawn. R5: Normal not normalized	2							
9105	11.5	9.5	2							R3: right, up, and ahead are all	2							
2134	0	9.5	0			1.5	4	1		found in the columns (typo?)	2							
					2	,		0.5		DE: Normal not namediaed								
35128	9.5	9.5	1.5							R5: Normal not normalized R5: normal transformed like point (w=1), not normalized. Wrist: modifying weights (main challenge) and done				1.5				
					2	. 2	4	0	'	challenge) not done				1.5				
39645	0	0	0															
92292	0	0	0							D4: position posedo um 4 - D5:								
98351	8.5	8.5	0	1	2	2 2	3	0.5	5	R4: position needs w=1. R5: Normal not normalized								

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) n	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?
899130	13.5	9.5	4	1	2	2 2	4	0.5		R5: Normal not normalized. Wrist: quite a lot of unnatural warping in forearm				4				
900016	0	0		·				0.0		warping in loream								
901170	0	0																
901196	0	0																
913249	0	0																
913333	0	0	0															
913346	0	0																
913566	12	10		1	2	2 2	4	1		SSD-GPU: remember to zero- initialize accumulation variables	2							
915221	0	0																
915250	0	0																
917863	12	10		1	2	2 2	4	1			2							
918150	0	0				_					_							
918228	0	0																
918257	0	0																
918309	11.5	9.5		1	2	2 2	4	0.5		R5: Normal not normalized	2							
918396	9.5	9.5		1	2					R5: Normal not normalized								
918464	11.5	9.5	2	1	2	2 2	4	0.5		R5: normal not normalized. Yes, sorry about the late lecture videos. Looking through materials beforehand to get started early is always a good idea regardless of video schedule	2							
918671	9.5	9.5	0	1						R5: normal not normalized	_							
918875	9.5	9.5		1						R5: Normal not normalized								
930484	6.5	6.5		1						R2: you want canonical unit rotation vectors, pos not needed for those (just use coord. value 1), R4: compute ToBindTransforms() missing reference in loop, inversion never applied. Also, SSD loop discards translation (fourth column) of transformation matrix.								
932440	11	9		1	2					R5: normal transformed like point (w=1), not normalized	2							
932440	5	5		1				U		point (w=1), not normalized	2							
939375	0	0		'	-	. 2												
942618	15	10		1	2	2 2	4	1			2	3						
942618 k28342	15	0		1	4	. 2	4	1			2	3	,					