OUTFIT7

Game Developer Expertise Test

TECHNICAL CHALLENGE:

Write a console application in C++ that skins a 3D mesh.
The goal is to transform the test mesh to the new pose using the provided data. The amount of bones that could affect one vertex is limited to 4. Please keep in mind that this task requires skinning on CPU (not GPU). You can use open source libraries for parsing OBJ, json and for math operations with matrices/vectors.

IMPORTANT: Your solution should maximize the performance of skinning. Consider math tricks, proper use of data structures, or any other ways to reduce the CPU time needed for skinning. Please describe your decisions in code comments. The performance of data serialization/deserialization does not matter, we are only interested in the performance of actual skinning (imagine that you have to do skinning every frame and serialization/deserialization happens once in a while).

In the archive you'll find the following files:
- **test_mesh.obj** test mesh in Wavefront OBJ format. You can preview it online or locally with any 3D viewer
- **bone_weight.json** separate file with bone indices and corresponding weights for every vertex of test_mesh.obj (it's in a separate file because OBJ format doesn't support skinning)
- **inverse_bind_pose.json** contains inverse bind pose column-major transformation matrices for every bone (in model space)
- **new_pose.json** contains new pose column-major transformation matrices for every bone (in model space)
- **result.png** the screenshot of the skinned mesh that you have to get in the end

You can use online resources, books, etc.
Ship the solution together with other answers through provided link in the e-mail.

ASPIRATIONS:

1. What did you work on in the last year mostly? Describe your usual daily tasks and responsibilities you had to take care of, your challenges and accomplishments.

2. What programming achievement are you most proud of? Tell us why and what kind of a problem did it solve or what solution did it deliver.

3. Game development is very diverse and almost no one is a "pro" in all of the categories. What parts are you good at and what parts are not your strong points? These are just some categories to think about but feel free to add your own: UI implementation, shaders writing, 3D animations and rigs implementation, IK, AI, navigation, project's architecture, BE communication, analytics, 2D animations, VFX, custom editor, ...

4. You got a task to change an existing fairly complex A/B test logic, modify it and introduce enhancements according to specifications. By checking the codebase, you see that it is hard to understand how systems are connected and related to each other and you feel stuck. What do you do, how would you approach it? Did you have similar experiences in the past - how did you approach them and what was the outcome?