PA6 – SIMD

Due Date

- See Piazza for due date and time
    - Grading the next day
- Submit program to perforce in your student directory
    - Sub directory called:
        - /PA6/...
    - Fill out your ***PA6 Submission Report.pdf***
        - Place it in the same directory as your solution
        - Enter the final Changelist number of your submission
        - Write up a quick discussion in the report
            - What you learned from this assignment so far

Goals

- Learn
    - SIMD, Intrinsics
    - Show off, you can program vector code!

Assignments

0. ***Finish implementing Class Vect4D***
    - Required methods are prototyped out
        - Make sure you add const and missing methods such as the big4
        - Make everything constant when possible
    - Vect4D - just like a 3D vector, except you add, sub, mult, div … all 4 elements {x,y,z,w}
        - Multiply element by element { a.x*b.x -> c.x, a.y*b.y->c.y, ...}
    - I supplied vect*matrix and dot product, the rest is obvious
        - Confused start a post

1. ***Convert a given Class Vect4D to*** ***Vect4D_SIMD***
    - Convert all methods to use intrinsics SIMD instructions
    - Test the code with data provided that
        1. Originally unaltered class (Vect4D) works.
        2. Modify and compile the new SIMD class (Vect4D_SIMD) works.
        3. Please verify that the new class creates the same output.
    - Run the test in Debug and Release
        1. Format your text file to look similar to sample text (keenan_output.txt)

2. Convert a given Class Matrix to *Matrix_SIMD*

- Convert all methods to use intrinsics SIMD instructions
- Test the code with data provided that
    1. Originally unaltered class (Matrix) works.
    2. Modify and compile the new SIMD class (Matrix_SIMD) works.
    3. Please verify that the new class creates the same output.
- Run the test in Debug and Release
    1. Format your text file to look similar to sample text (keenan_output.txt)

3. Convert method Vect4D * matrix to *Vect4D_SIMD * Matrix_SIMD*

- Convert all methods to use intrinsics SIMD instructions
- Test the code with data provided that
    1. Originally unaltered method (Vect4D * Matrix) works.
    2. Modify and compile the new SIMD class (Vect4D_SIMD *Matrix_SIMD) works.
    3. Please verify that the new class creates the same output.
- Run the test in Debug and Release
    1. Format your text file to look similar to sample text (keenan_output.txt)

4. Convert static method LERP() to *LERP_SIMD()*

- Convert all methods to use intrinsics SIMD instructions
- Test the code with data provided that
    1. Originally unaltered method (LERP) works.
    2. Modify and compile the new SIMD class (LERP_SIMD) works.
    3. Please verify that the new class creates the same output.
- Run the test in Debug and Release
    1. Format your text file to look similar to sample text (keenan_output.txt)

General:

- Write all programs in cross-platform C or C++.
    o Optimize for execution speed and robustness.
- Create a programming file for each problem, for example
    o Student directory
        ▪ /PA6/…
    o Make sure that each problem can be compiled and run through the checked in solution
- Do all your work by yourself
    o Feel free to talk with others about setup, version control, ideas
    o But do not copy your friend's code.
        ▪ Please don't - I can tell with my difference tools
    o Feel free to share ideas
- Check in the problems multiple times, at least 3 times per problem
    o Have reasonable check-in comments
    o Seriously, I'm checking

- Make sure that your program compiles and runs
  - Warning level 4, some times that is not possible due to MS headers…
  - Your code should be squeaky clean.
- We are using Perforce
  - You should have received the document describing how to login.
    - Please look at the documentation and videos under the reference directory
  - Submit program to perforce in your student directory
    - Sub directory called: /PA6/…
      - As described above
  - All your code must compile from perforce with no modifications.
    - Otherwise it's a 0, no exceptions
  - Only Visual Studio 2013 allowed

Validation

Simple check list to make sure that everything is checked in correctly

- Did you do all SIMD problems?
- Do they compile and run without any errors?
- Warning level 4 free (or as close as you can go)?
- Did you fill out the submission report?
- Submitted it into /PA6 directory?
- Can you delete you local drive, regrab the /PA6 directory?
  - Is all the code there?
  - Does it compile?
- Did you check in your text files?

Hints

Most assignments will have hints in a section like this.

- Do many little check-ins
  - Iteration is easy and it helps.
  - Perforce is good at it.
- Look at the lecture notes!
  - A lot of good ideas in there.
  - The code in the examples work.
- It's a puzzle
  - Keep trying to work at piecing the instructions together
  - Hunt the manual for ideas…
    - http://msdn.microsoft.com/en-us/library/y0dh78ez%28v=vs.100%29.aspx
- Use the FORUMs
  - This is much harder than the last assignment.
  - See me during office hours.
  - Read, explore, ask questions in class