CSCI 551 – Final Parallel Program Proposal Summary (fill in answers)

	Question	Answer	Notes
1	What program (algorithm) will you start with?	Rotation of images to an arbitrary angle using a rotation matrix for a deck of cards	
2	What method(s) do you plan to use to make it run in parallel?	OpenMP	
3	What mathematics (numerical) method is involved?	Vector/matrix	
4	How can you verify correctness (test it mathematically)?	I can compare the matrices to what they are supposed to be when correctly rotated	
5	What speed-up do you expect to achieve and how will you demonstrate?	at least 50% using shared memory with 2 or more cores	
6	**Why is this of interest to you?**	I didn't have enough time to get the result i wanted. This assignment was interesting to me and know that i know better i want to get it working well	
7	**What do you see as your biggest challenge to complete this?**	The biggest challenge i see is manipulating the matrices to rotate the cards since that is the main part of the assignment	

Please consider the following when you write a simple proposal that answers the questions above and ***be as concise as possible*** with your answers above. You can elaborate in Notes.

For the last 2 questions, please provide a few sentences describing why this is a significant demonstration of what you have learned in CSCI 551 and why it is challenging for you.

1) What sequential program (and algorithm) do you plan to start with or develop?
    - E.g., finding large prime numbers to multiply to generate large semi-primes and then searching for the prime factors exhaustively
    - E.g., numerical simulation using integration of a train over 14,400 seconds, with a $1/1000^{th}$ second step size, computing jerk, velocity and position given an acceleration function from the math library
    - Rotation of images to an arbitrary angle using a rotation matrix for a deck of cards
    - Etc.

2) What method to you plan to use to make it parallel?
    - OpenMP
    - Pthreads
    - MPI
    - Hybrid (MPI with OpenMP)
    - Comparative (e.g., MPI vs. OpenMP)
    - Alternative - e.g., CUDA

3) What mathematics or numerical method is involved?
    - Integration
    - Linear algebra
    - Vector/matrix
    - Root solving
    - Function generation or interpolation
    - Prime numbers and factorization
    - Numerical accuracy, precision and error for integration
    - Numerical accuracy, precision and error for linear systems
    - Other? (e.g. probability, cybersecurity (hash or encrypt/decrypt), etc.)

4) How can you test it to know it is correct?
    - Compare to known symbolic math solution
    - Compare to another program (e.g., MATLAB, online tool, other)
    - Verification with math – e.g., plug solution vector back into system to verify it generates the RHS
    - Simple test with expected outcome

5) What speed-up do you expect and where do you plan to test this?
    - At least 50% using shared memory with 2 or more cores
    - Up to 4x using distributed memory with 8 or more nodes
    - At most 20% using Pthreads and shared memory with 2 or more cores