Programming Assignment #5

Dot Product

Date: __/__/2015	***Due***: __/__/2015
Grade: 100 points	***Hard Deadline***: __/__/2015

Write a CUDA program that calculates the dot product of two given vectors (X and Y) of arbitrary N elements (see eq. 1). The given vectors should be able to store any type of data (i.e. *short*, *int*, *float*, etc.). Your program should apply the Brent's theorem and the parallel reduction with full loop unrolling to achieve the best performance possible. The kernel should outputs the partial sums result from each thread block and the final result R should be calculated in the host side.

$$R = \sum_{i=0}^{N-1} X_i Y_i \qquad (1)$$

Hint: use the parallel reduction method explained in lecture No.4 and *template* C++ keyword for an arbitrary data type.

Testing:

- Generate a random number sequence on N elements and allocate memory for both CPU and GPU sides.
- Write a sequential CPU version and test it using the generated data set
- Write the parallel GPU version and test the output results with the CPU outputs.

Submission Instructions:

- Submit your program to CSE327_CUDA@gmail.com before deadline. Answers submitted due the hard deadline will get only %80 of the grade.
- Subject of message must be { **CU_PA5** }
- You must use the given templates while writing you programs.

- Attach your code files only; don't include any documents or pictures.
- Any violations to previous Instructions will cause your assignment to be rejected.