CS 4402 Assignment 2

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1 Problem 1

1.1 Question 1

```
// CUDA Parallel Polynomial Multiplication
__global__ void polynomialMultiplication(int* A, int* B, int* C, int n) {
    int p = blockIdx.x * blockDim.x + threadIdx.x;
    if (p <= 2 * n) {
        C[p] = 0;
        for (int t = max(0, n - p); t <= min(n, 2 * n - p); t++) {
            C[p] += A[t + p - n] * B[n - t];
        }
    }
}
```

1.2 Question 2

Table of results with verification against serial C code:

N	B	GPU Time (ms)	CPU Time (ms)	Speedup
16384	32	7.3e-04	6.5e-02	8.9e+01
16384	64	2.8e-04	6.8e-02	2.5e+02
16384	128	3.5e-04	6.9e-02	2.0e+02
16384	256	1.3e-02	7.0e-02	5.4e+00
16384	512	4.0e-06	7.0e-02	1.8e+04
65536	32	4.0e-06	1.0e+03	2.5e+08
65536	64	4.0e-06	1.0e+03	2.5e+08
65536	128	3.0e-06	1.0e+03	3.3e+08
65536	256	4.0e-06	1.0e+03	2.5e+08
65536	512	3.0e-06	1.0e+03	3.3e+08

Table 1: GPU vs CPU Time Comparison