

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	1.1e-03	6.7e-02	58.321
16384	64	9.1e-04	6.6e-02	72.946
16384	128	9.3e-04	6.8e-02	72.333
16384	256	8.9e-04	6.9e-02	76.738
16384	512	9.7e-04	6.9e-02	70.441
65536	32	7.7e-03	1.0e+03	129729.172
65536	64	7.0e-03	1.0e+03	142685.000
65536	128	8.9e-03	1.0e+03	112481.750
65536	256	7.5e-03	1.0e+03	133201.344
65536	512	8.1e-03	1.0e+03	123771.719

Table 1: GPU vs CPU Time Comparison