CSE 340 Final

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I. Question (15 points)

Write the method

```
int adjacent_primes(int N)
```

which counts the number of primes p less than N, where $p + 2$ is also prime.

II. Question (20 points)

Solve Question I by dividing the jobs into the processors equally. Use manager and worker paradigm to accomplish this.

III. Question (15 points)

Write the method

```
int* create_from_counts(int* counts,
                        int* values, int N)
```

which creates an array and fill the elements as follows. First there are $counts[0]$ elements which have the value of $items[0]$, then there are $counts[1]$ elements which have the values of $items[1]$, ..., and in the end there are $counts[N-1]$ elements which have the values of $items[N-1]$. For example if the counts array contains elements 2, 3, 1 and the values array contains elements 10, 25, 15 then the resulting array will have the elements 10, 10, 25, 25, 25, 15 in that order.

IV. Question (20 points)

Write the method

```
double evaluate(int* a)
```

which evaluates the polynomial $a_0x^0 + a_1x^1 + \ldots + a_{n-1}x^{n-1}$ at point x. Assume that the coefficients a_i are stored in an array and all processors have n/p elements of the array a in the order of their processor id's. x is read by processor 0.

V. Question (20 points)

Write the method

```
void is_palindrome(int* a)
```

which checks if the array a is palindrome or not. An array is palindrome if it is equal to its reverse. Assume that array a is stored in an array and all processors have n/p elements of the array a in the order of their processor id's. Processor 0 will print the result.

VI. Question (20 points)

Write the function *gather_all* which gathers the elements in all processors into an array a residing in processor 0 in the following way: Processor 0 will send 1 element, processor 1 will send 2 elements, processor 2 will send 3 elements, etc.