Factoring

Due: March 26, 2024

Write a function

```
vector<unsigned long> factor(unsigned long n) { }
```

that returns the factorization of n. The returned value should be a vector in the form

```
(p_1, e_1, …, p_k, e_k)
```

where the elements with even indices are the prime factors in increasing magnitude, and the elements with odd indices are the nonzero exponents. So, for example, `factor(60)` should return `(2, 2, 3, 1, 5, 1)`, `factor(17)` should return `(17, 1)` and `factor(32)` should return `(2, 5)`.

Your function should be able to handle all legal values of $n > 1$.

Suggestion: Check for divisibility by small primes. After that, if the number is still large, use Miller-Rabin to check if it is prime. If it is not, use Pollard-Rho to find a prime factor, and then factor the smaller remaining number.