Extended Euclidean Algorithm

Algorithm

```python
def EEA(x,y):
    a, b = max(x, y), min(x, y)
    T1, T2 = 0, 1
    while True:
        if b == 0:
            return T1
        Q,R = divmod(a,b)
        T = T1 - (T2*Q)
        a = b
        b = R
        T1 = T2
        T2 = T
```

Explanation

Above I created a function for the Extended Euclidean Algorithm and from looking at it you can see that the end condition for the function is when b equals 0. This means that the run time of the program is determined by how long it takes for b to equal zero. And we can see that every iteration the b value is being updated by the R value. And we get the R value from the modulus of a and b. This means that b is being reduced every iteration at the rate of a mod b and this means that the runtime of the algorithm is O(log(b)) and therefore polynomial.