Extended Euclidean Algorithm (pseudocode version)

The following algorithm will compute the GCD of two polynomials f, g as well as linear combination $sf + tg = GCD(f, g)$ (and more information). **Important convention**: $LC(f) :=$ to the leading coefficient of f, and we define $LC(0) = 1$.

Input: f, g polynomials.
Output: Integer l, polynomials p_i, r_i, s_i, t_i for $0 \leq i \leq l+1$, and polynomial q_i for $1 \leq i \leq l$, such that $s_i f + t_i g = r_i$, and in particular, $s_l f + t_l g = r_l = GCD(f, g)$.

- Set $p_0 := LC(f);\ p_1 := LC(g);,\ r_0 := f/p_0;\ r_1 := g/p_1;.$
- Set $s_0 := 1/p_0;\ t_0 := 0;\ s_1 := 0;\ t_1 := 1/p_1;$
- i:=1; (counter);
- While $r_i \neq 0$ do
  - $q_i := r_{i-1}$ quotient r_i;
  - $p_{i+1} := LC(r_{i-1} - q_i r_i)$;
  - $r_{i+1} := (r_{i-1} - q_i r_i)/p_{i+1}$;
  - $s_{i+1} := (s_{i-1} - q_i s_i)/p_{i+1}$;
  - $t_{i+1} := (t_{i-1} - q_i t_i)/p_{i+1}$;
  - $i := i + 1$;
- od;
- l:=i-1;
- $RETURN(l, p_i, r_i, s_i, t_i, q_i)$;