Extended Euclidian Algorithm

Write $GCD(252, 198) = 18$ as a linear combination of 252 & 198.

[Populate a table with the Euclidian method steps:]

j	r_j	r_{j+1}	q_{j+1}	r_{j+2}	s_j	t_j
0	252	198	1	54	1	0
1	198	54	3	36	0	1
2	54	36	1	18	–	–
3	36	18	2	0	–	–

(By definition) $s_0 = 1$, $t_0 = 0$; $s_1 = 0$, $t_1 = 1$

At this point we can see that $GCD(252, 198)$ is indeed equal to 18.

Now fill in s & t for $j = 2, 3$ & 4.

$$s_2 = s_0 - s_1 q_1 = 1 - 0 = 1$$
$$t_2 = t_0 - t_1 q_1 = 0 - 1(1) = -1$$

$$s_3 = s_1 - s_2 q_2 = 0 - (1)(3) = -3$$
$$t_3 = t_1 - t_2 q_2 = 1 - (-1)(3) = 4$$

$$s_4 = s_2 - s_3 q_3 = 1 - (-3)(1) = 4$$
$$t_4 = t_2 - t_3 q_3 = -1 - (4)(1) = -5$$

So: $18 = 4 \cdot 252 + (-5)(198)$ [verified]