1 Convex hull: definitions, classical algorithms.

1.1 Convex hull by triangulation

Consider the following convex hull algorithm:

**Input:** $S$ a point set.

sort $S$ by $x$-coordinate;

create a circular list with the three leftmost points of $S$

such that $(u, u.next, u.next.next)$ is positively oriented and $u$ rightmost;

$S = S \setminus \{u, u.next, u.next.next\}$;

while $S \neq \emptyset$

$v =$ leftmost point in $S$;

$S = S \setminus \{v\}$;

$w =$ copy($u$);

while $(v, u, u.next)$ negative

$\{u = u.next;\}$

$v.next = u; u.pred = v$;

while $(v, w, w.pred)$ positive

$\{w = w.pred;\}$

$v.pred = w; w.next = v$;

$u = v$;

$\}$

1.1.1 Run the algorithm

Run (by hand) the algorithm on the example provided on the attached example and draw on the example the line segment $uv$ in green each time the code pass through the line of the code marked with a green dot, draw $wv$ in blue for the code line with a blue dot, and draw $wv$ in red for the code line with a red dot.

1.1.2 Complexity

What is the complexity of this algorithm on a set of $n$ points (hint: use Euler relation).
Convex hull by triangulation

Run on the point set:

Complexity: