In two dimensions, the next figure shows feasible directions at different kinds of feasible points (where there are no active constraints, one active constraint, and two active constraints).

\[7x_1 + 8x_2 \geq 3\]
\[x_1 + 6x_2 \geq 2\]
\[16x_1 + 7x_2 \leq 28\]

Figure 1: Feasible directions.

The following figure shows feasible descent directions when the objective function is \(\ell(x) = c^T x = x_1 - \frac{1}{3} x_2\).

Figure 2: Feasible descent directions.
Iteration $k$ of the Simplex Method for All-Inequality Form.

Iteration $k$ begins with $x_k$ satisfying $Ax_k \geq b$ and a working set $W_k$ of indices $\{\omega_1, \ldots, \omega_n\}$ such that the working-set matrix $W_k$ is nonsingular and $W_kx_k = b_k$, where $b_k$ contains the associated components of $b$.

Step 1.
% Solve for the working-set multipliers $\lambda_k$ and check their signs.
Solve $W_k^T\lambda_k = c$, where the linear objective to be minimized is $c^Tx$;
if $\lambda_k \geq 0$ then break;  % An optimal vertex has been found.

Step 2.
% Pick a constraint $s$ to be removed from the working set.
Choose an index $s$ such that $[\lambda_k]_s < 0$, using an appropriate anti-cycling rule;

Step 3.
% Compute a search direction $p_k$ that moves off constraint $\omega_s$.
Solve $W_kp_k = e_s$ for the simplex direction $p_k$;

Step 4.
% Choose the scalar step $\alpha_k$ to be taken along $p_k$.
% Find the decreasing constraints along $p_k$.
$D_k \leftarrow \{i \notin W_k : a_i^Tp_k < 0\}$;
if $D_k = \emptyset$ then break;  % $c^Tx$ is unbounded below in the feasible region.
for $i \in D_k$, $\gamma_i \leftarrow (a_i^Tx_k - b_i)/(-a_i^Tp_k)$ end
$\alpha_{F_k} \leftarrow \min\{\gamma_i\}$ for $i \in D_k$;  % $\alpha_{F_k}$ is the maximum feasible step.
$\alpha_k \leftarrow \alpha_{F_k}$;  \quad $x_{k+1} \leftarrow x_k + \alpha_k p_k$;

Step 5.
% Choose a constraint $t$ to be added to the working set;
$S_k \leftarrow \{i \in D_k \} such that $\gamma_i = \alpha_{F_k}$;  % $S_k$ contains blocking constraint indices.
Choose $t \in S_k$, using an appropriate anti-cycling rule;
$W_{k+1} \leftarrow W_k - \{\omega_s\} + \{t\}$;  % Update the working set.
$W_{k+1} \leftarrow W_k$ with row $s$ replaced by row $t$ of $A$;
k \leftarrow k + 1;
The following figure shows the path of simplex iterates on a baby LP.

![Diagram of simplex iterates](image)

Figure 3: The path of simplex iterates on a baby LP.

The following figure shows two degenerate vertices, along with two choices for the working set.

![Diagram of degenerate vertices](image)

Figure 4: A degenerate vertex and the effect of the working set.