Find a solution (or solutions) that satisfies the KKT conditions for the following optimization problem:

\[
\begin{align*}
\text{minimize} & \quad f(x) = 2x_1 + x_2 \\
\text{subject to} & \quad h(x) = x_1 + x_2 - 1 = 0 \\
& \quad g(x) = x_1 + 2x_2 - 2 \leq 0
\end{align*}
\]

The KKT conditions are given by:

1. \( \nabla_x L(x^*, \lambda^*, \mu^*) = \nabla_x f(x) + \lambda^* \nabla_x h(x^*) + \mu^* \nabla_x g(x^*) = 0 \)
2. \( \mu^* \geq 0 \)
3. \( \mu^* g(x^*) = 0 \)
4. \( g(x^*) \leq 0 \)
5. \( h(x^*) = 0 \)

**Solution:** Conditions are as follows (we drop the * for brevity):

1. \( 2 + \lambda + \mu = 0 \)
2. \( 1 + \lambda + 2\mu = 0 \)
3. \( x_1 + x_2 - 1 = 0 \)
4. \( \mu(x_1 + 2x_2 - 2) = 0 \)
5. \( x_1 + 2x_2 - 2 \leq 0 \)

Solving 1. and 2., we obtain: \( \lambda^* = -3, \mu^* = 1 \). From 3. and 4., we get: \( x_1^* = 0, x_2^* = 1 \). This solution clearly satisfies condition 5.

Hence, \( x^* = \begin{bmatrix} 0 \\ 1 \end{bmatrix} \) satisfies the KKT conditions and is a candidate for being a minimizer for the given optimization problem.