$$-u'' = f$$

$$u(0) = 0$$

$$u'(1) + u(1) = 1.$$

$$-[u'v]_0^1 + \int_0^1 u'v' = \int_0^1 fv$$

$$-[u'v]_0^1 = -u'(1)v(1) = (u(1) - 1)v(1)$$

The problem becomes find u s.t.

$$\underbrace{\int_0^1 u'v' + (u(1)-1)v(1)}_{a(u,v)} = \underbrace{\int_0^1 fv}_{f(v)}.$$

$$\Rightarrow \quad A\underline{u} = b.$$

$$[A_{ij}] = [a(\varphi_j, \varphi_i)] \quad , \quad b_i = \int_0^1 f\varphi_i.$$