Federal income tax allows a deduction for any state income tax paid during the year. In addition, the state of Alabama allows a deduction from its state income tax for any federal income tax paid during the year. The federal corporate income tax rate is equivalent to a flat rate of 34% if the taxable federal income is between $335,000 and $10,000,000, and the Alabama rate is 5% of the taxable state income.

Both the Alabama and the federal taxable income for a corporation are $1,000,000 before either tax is paid. Because each tax is deductible on the other return, the taxable income will differ for the state and federal taxes. One procedure often used by tax accountants to find the tax due in this and similar situations is called iteration and is described by the five steps below.

1. Make an estimate of the federal taxes due by assuming no state tax is due. Deduct this estimated federal tax due from the state taxable income and calculate an estimate of the state taxes due on the basis of this assumption.
2. Deduct the estimated state tax due as computed in step #1 from the federal taxable income and calculate a new estimate of the federal tax due under this assumption.
3. Deduct the new estimated federal income tax due as computed in step #2 from the state taxable income and calculate a new estimate of the state taxes due on the basis of these calculations.
4. Repeat the process in steps #2 and #3 to get a better estimate of the taxes due to both governments.
5. Continue this process until the federal tax changes from one repetition to another by less than $1. What federal tax is due? What state tax is due?

To find the tax due each government directly, we can solve a matrix equation.

1. Create two linear equations that describe this taxation situation, convert the system to a matrix equation, and solve the system to see exactly what tax is due to each government.
2. What is the effective rate that this corporation pays to each government?

Show appropriate work to get full credit. Due: Fri, 11/5 in class.