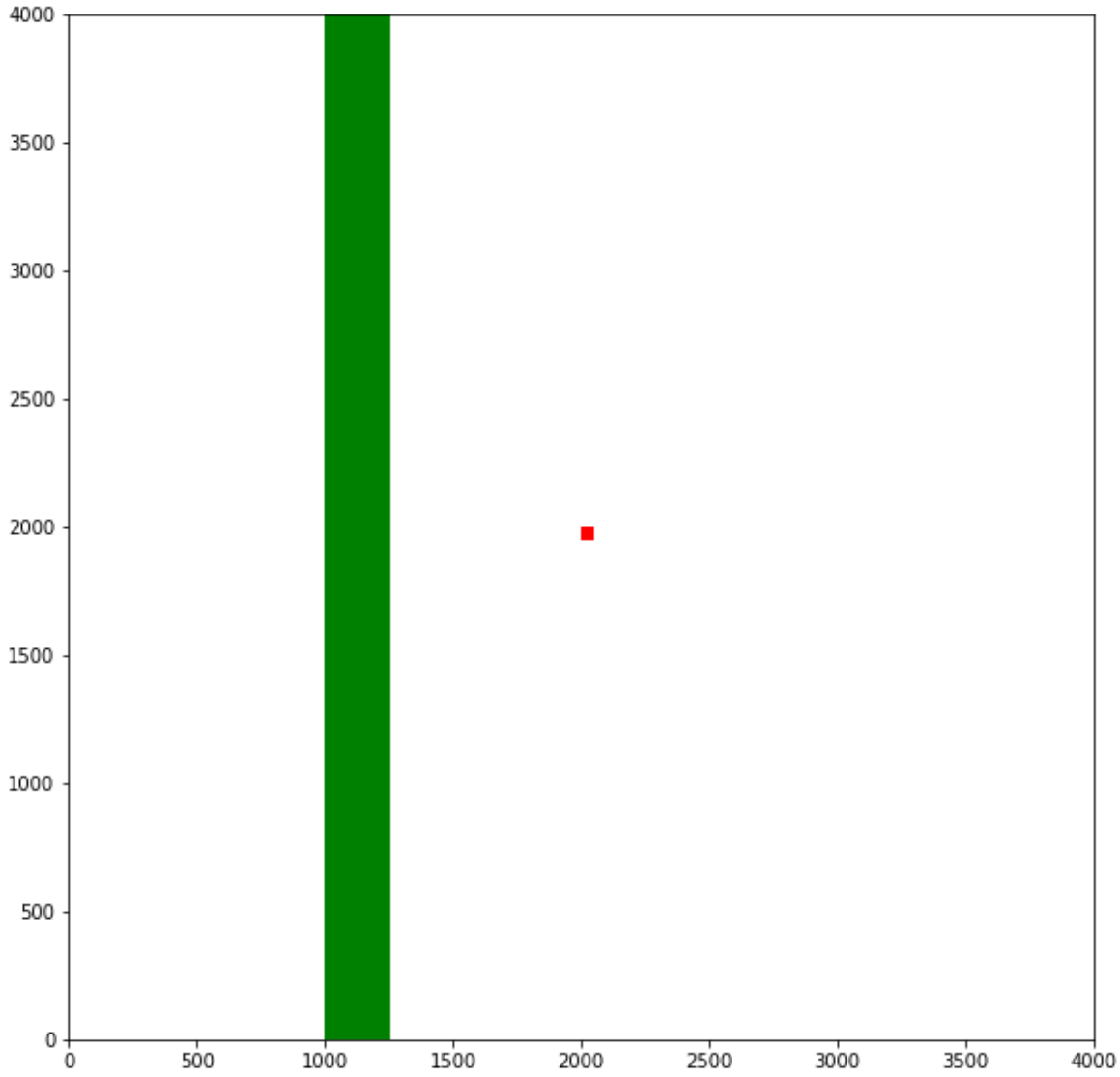
CIE 5440. Finite Differences Assignment

Due date: Midnight, Sunday 24 June, 2018

You are asked to simulate flow to a well near a river with MODFLOW. The river runs North-South, is very long and 250 m wide. The river penetrates the aquifer only slightly. The resistance of the bottom of the river is equal to c. The well is located approximately 800 m East of the eastern river bank. The discharge of the pumping well is 1000 m^3/d. The water level in the river is equal to 10 m. The transmissivity of the aquifer may be approximated as constant everywhere and equal to 200 m^2/d. Before the well started pumping, the head was equal to 10 m everywhere. The layout of the model is shown below. It is up to you to select the extent of the model and the cell size. It is not necessary to make cells smaller than 50 by 50 meter. You don't need to use more than one layer.



You are asked the following:

1. Create a MODFLOW model of the situation above for the case that the flow field has reached steady state, using that the riverbed resistance is 100 days. Create a contour plot and label the contours.
2. Compute the head in the cell containing the well for six different values of the bottom resistance c: 10, 20, 40, 80, 160, 320, and 640 days. Make a graph with the resistance along the horizontal axis and the head in the cell containing the well along the vertical axis.
3. Add enough explanations to the Notebook such that it is clear what you are doing and why. Label axes, add titles, put numbers along contour lines, etc.
4. Email your completed notebook to geo2tudelft@gmail.com before the due date. Change the name of the Notebook to yourlastname_fd4.ipynb.