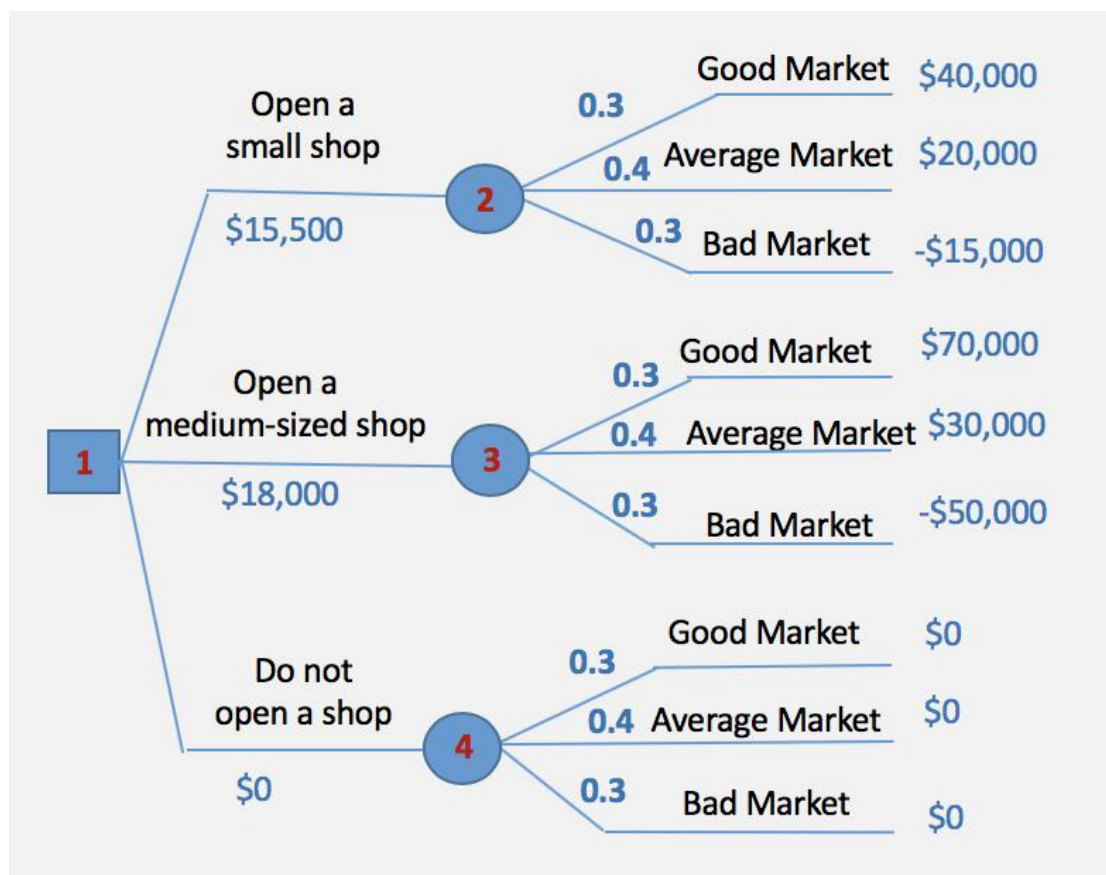


This tutorial will show the steps to draw a decision tree using the pre-installed on all BU MET V-PCs application Microsoft Excel Add-In 'TreePlan'.

Case: A business owner is considering whether to open a new shop in City A. The decision alternatives are: (1) open a small shop; (2) open a medium-sized shop; (3) do not open a shop. The amount of profit that could be earned depends on the market conditions: Good Market, Average Market, and Bad Market. The payoff table is shown below:

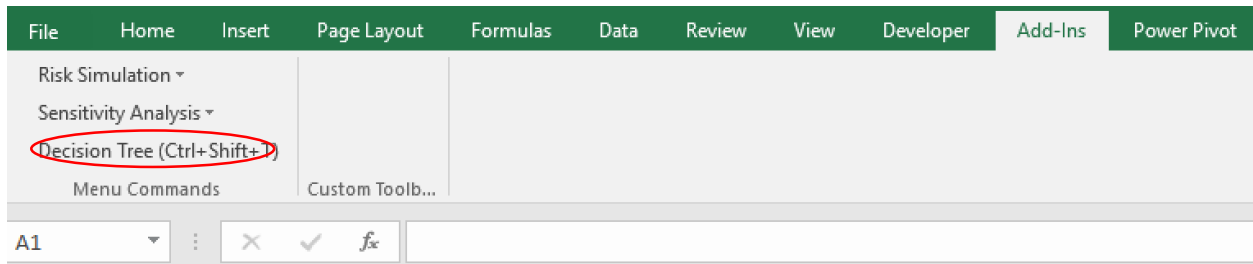
Alternatives	States of Nature			EMV
	Good Market	Average Market	Bad Market	
Small Shop	\$40,000	\$20,000	-\$15,000	\$15,500
Medium-Sized Shop	\$70,000	\$30,000	-\$50,000	\$18,000
No Shop	\$0	\$0	\$0	\$0
Probability	0.3	0.4	0.3	

Based on the payoff table, first we can draw a decision node 1, which has three branches including "open a small shop", "open a medium-sized shop", and "do not open a shop" (see below). Each of the chance nodes 2, 3, and 4 has three states of nature: good market, average market and bad market. We can assign the values and probabilities for each branch, and calculate the EMV for each node. By comparing the EMV, the best EMV for decision node 1 is \$18,000, so, the business owner should open a medium-sized shop.



Now, we will use the Excel Add-in TreePlan to build a decision tree based on this case.
Open V-Lab: <https://met-vmlab.bu.edu/> and log in to your BU account.

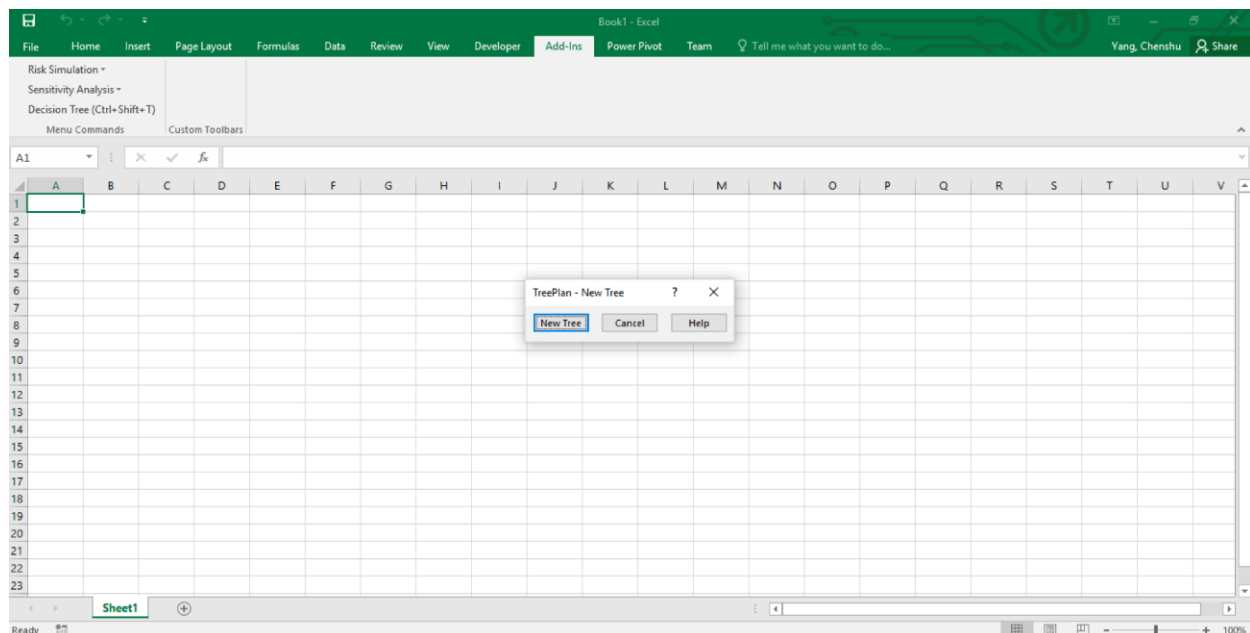
Open Excel 2016 and open a new excel worksheet. → Choose Add-Ins → Decision Tree.



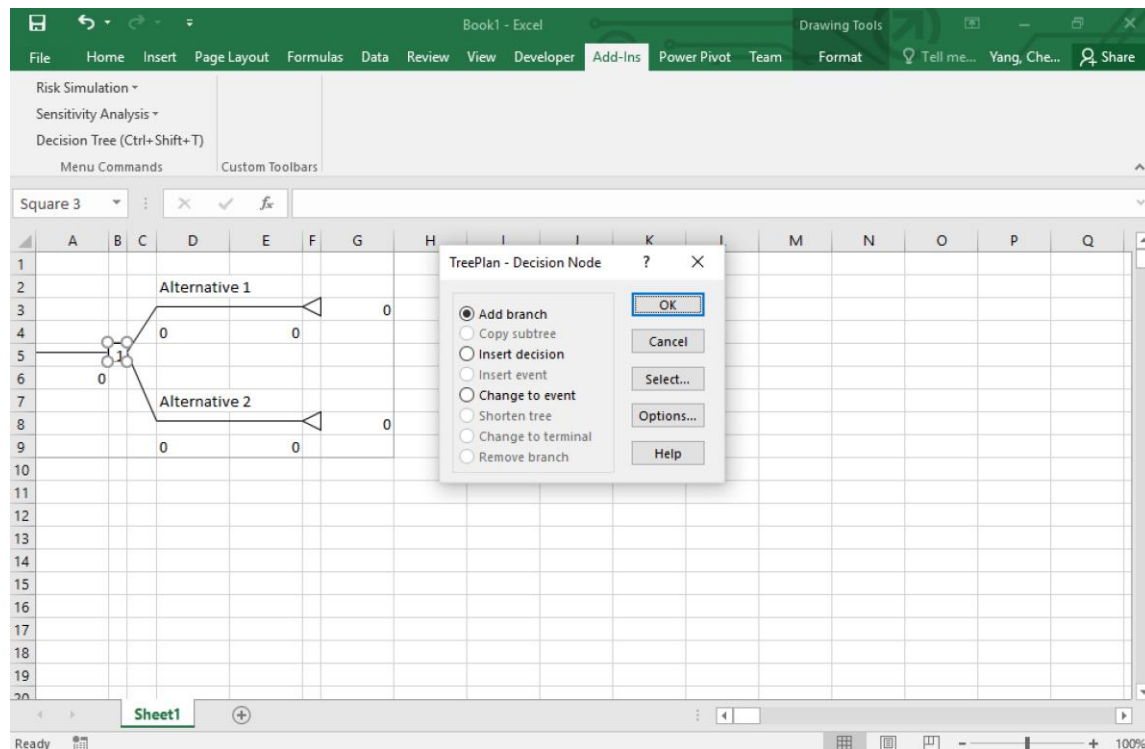
Building a Decision Tree in Excel Add-in TreePlan: A Step-By-Step Approach

- Step 1: Getting Started
- Step 2: Adding Branch
- Step 3: Naming Alternatives
- Step 4: Adding chance node
- Step 5: Naming Alternatives
- Step 6: Copy Subtree
- Step 7: Paste Subtree
- Step 8: Inserting Values

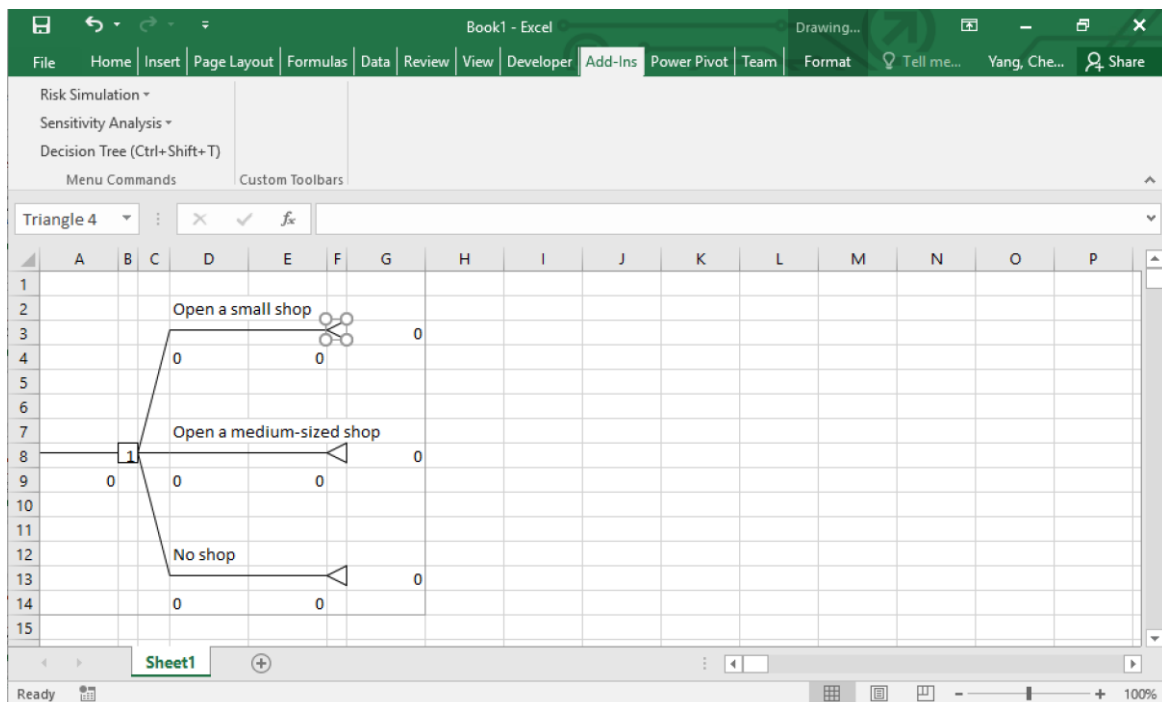
Step 1: Getting Started. In a new worksheet, select cell A1. From **Add-Ins** tab choose **Decision Tree** from the **Menu Commands** group, then click **New Tree**.



Step 2: Adding Branch. Now the decision tree has two alternatives. Click cell B5, from **Add-Ins** tab choose Decision Tree from the **Menu Commands** group, click **Add Branch** and click **OK**.

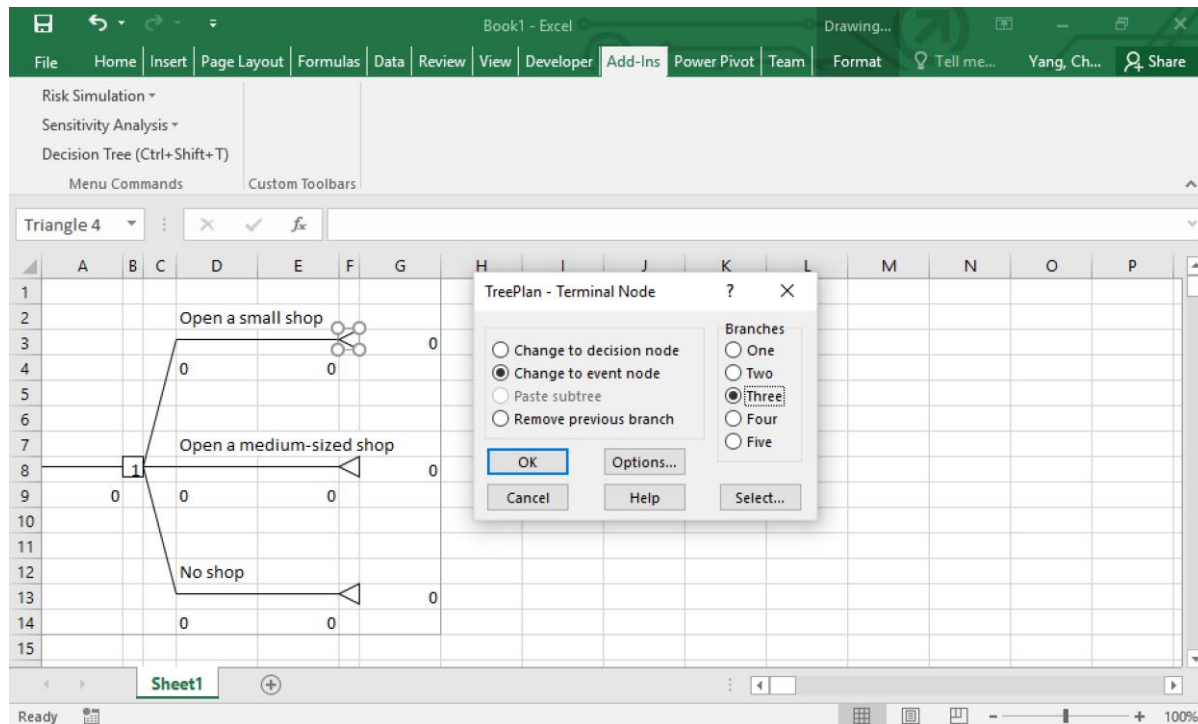


Step 3: Naming Alternatives. Entering “Open a small shop” in cell D2, “Open a medium-sized shop” in cell D7, and “No shop” in cell D12 instead of ‘Alternative 1’, ‘Alternative 2’ and ‘Alternative 3’.

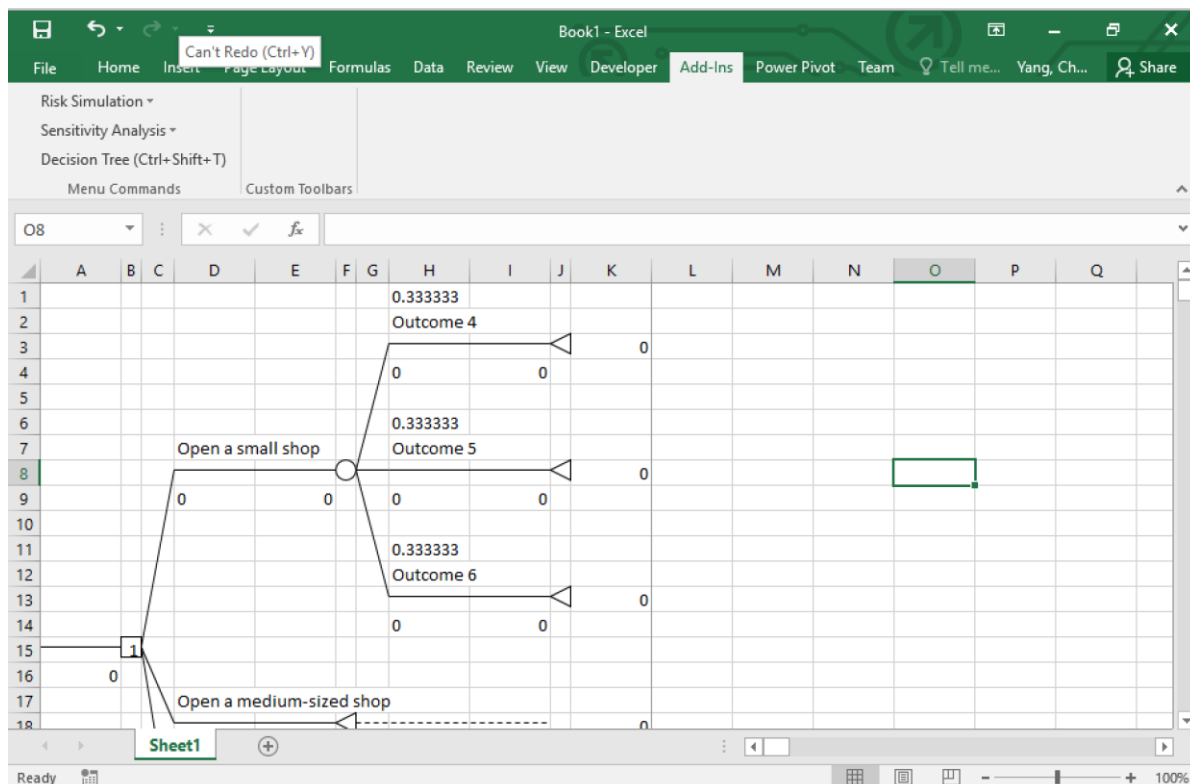


Scrip for the Tutorial: Building a Decision Tree in Microsoft Excel Add-In 'TreePlan'

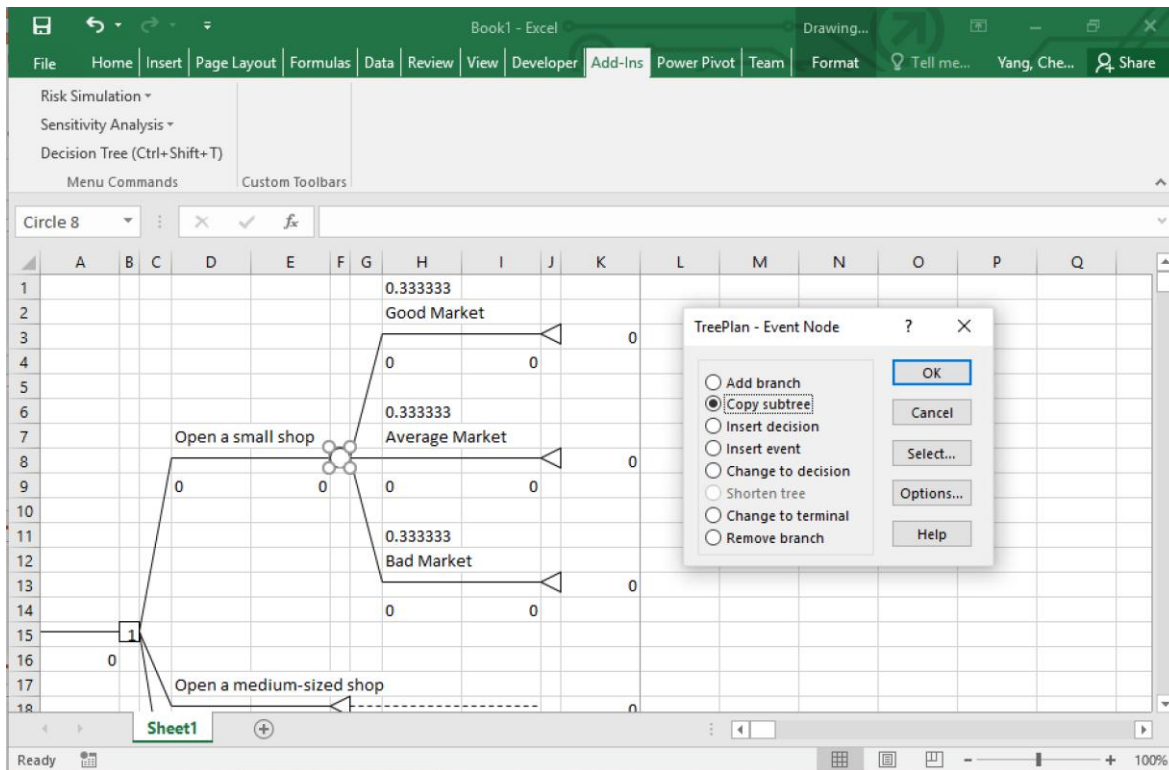
Step 4: Adding chance node. Click cell F3, choose Decision Tree from the Menu Commands group. Then select **Change to event node**. Select **Three** in the Branches section and Click **Ok**.



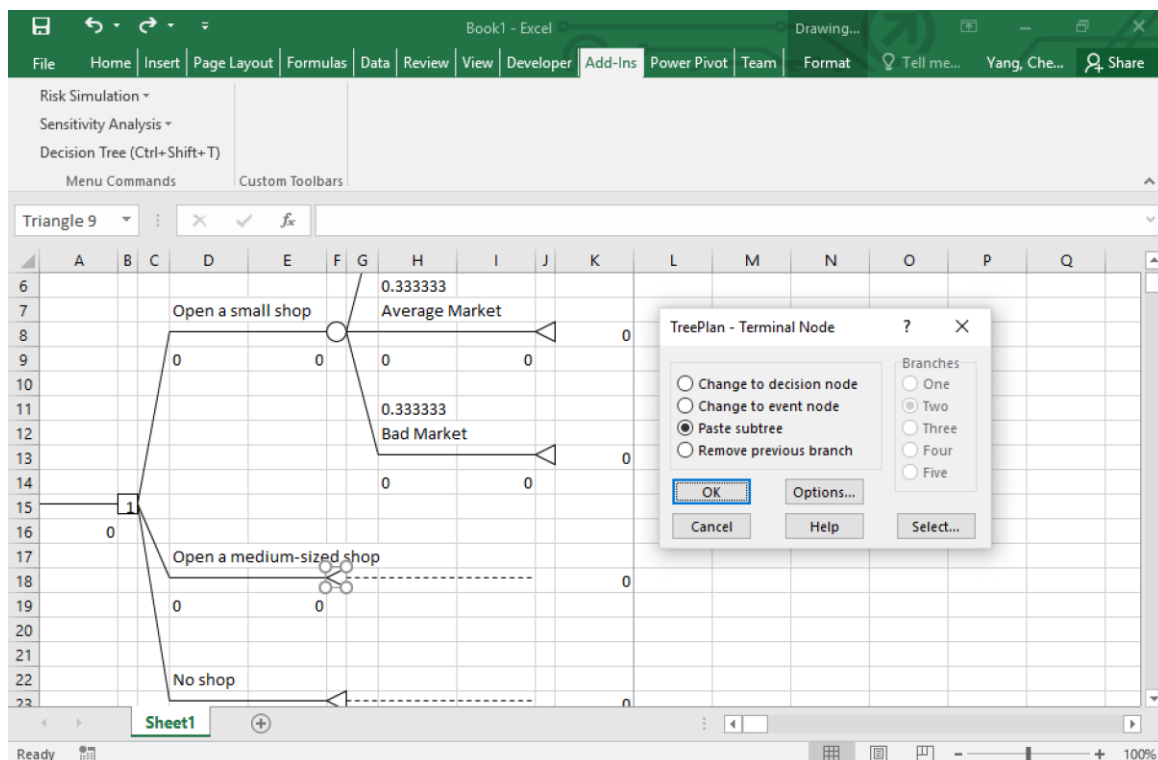
Step 5: Naming Alternatives. Entering “Good Market” in cell H2, “Average Market” in cell H6, and “Bad Market” in cell H11 instead of ‘Outcome 1’, ‘Outcome 2’ and ‘Outcome 3’.



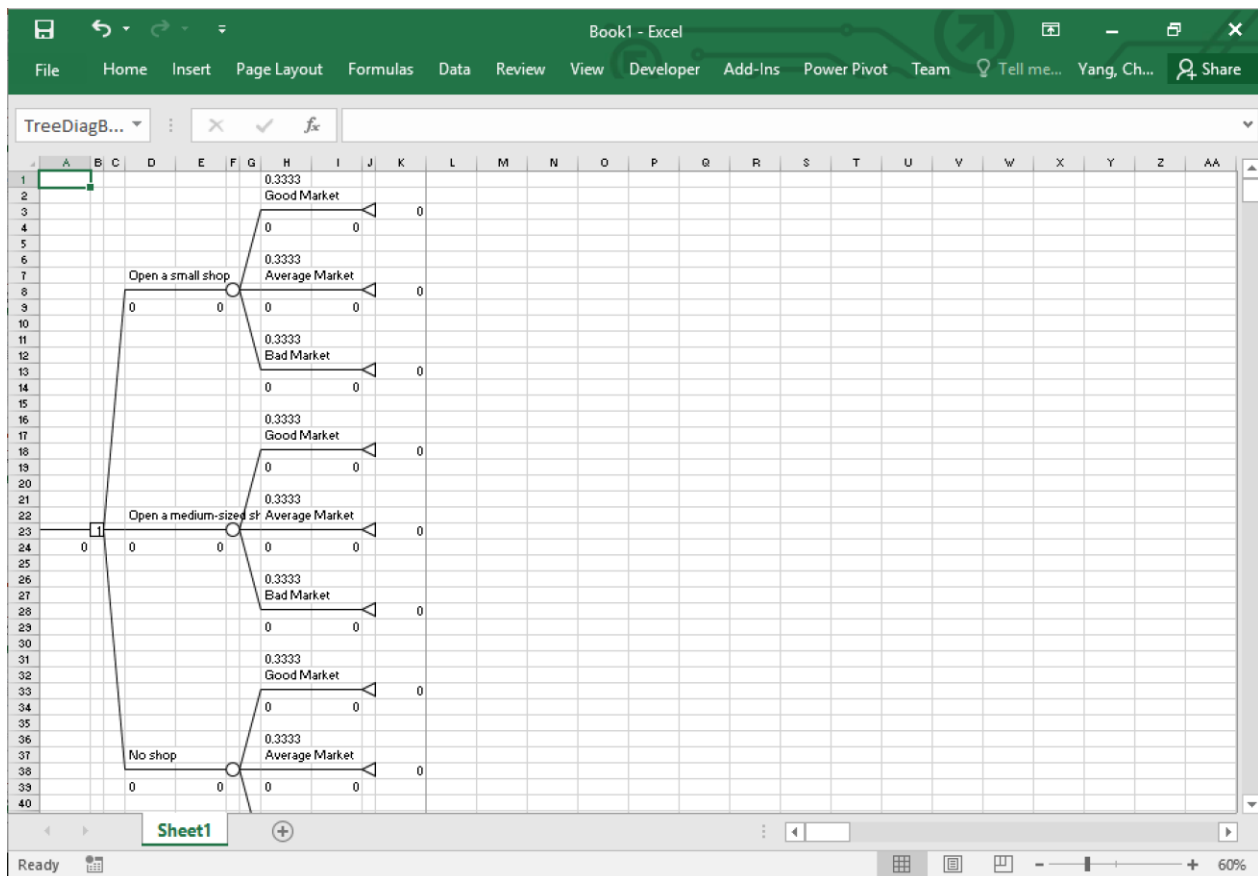
Step 6: Copy Subtree. Click on cell F8, choose Decision Tree from the **Menu Commands** group. Select **Copy Subtree**.



Step 7: Paste Subtree. Click on cell F18, choose Decision Tree from the **Menu Commands** group, then select **Paste subtree**.



Click on cell F8, **Copy Subtree**, and click cell F33 and paste the subtree, the decision tree will be shown as the following:



Step 8: Inserting Values. List the values for each branch based on the given payoff tables.

- In cell H1, H11, H16, H26, H31 and cell H41, input 0.3;
- In cell H6, H21 and cell H36, input 0.4.
- In cell K3, K8 and cell K13, input value \$40,000, \$20,000, -\$15,000 respectively.
- In cell K18, cell K23, and cell K28, input value \$70,000, \$30,000, -\$50,000 respectively.

The EMV of the decision tree will be calculated automatically by Excel. The best EMV is \$18,000, which is opening a medium-sized shop.

BU MET AD 715 Quantitative & Qualitative Decision Making
 Scrip for the Tutorial: Building a Decision Tree in Microsoft Excel Add-In 'TreePlan'

