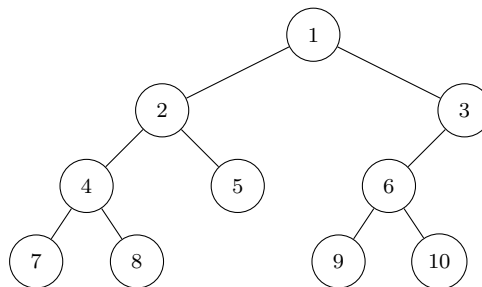


Submit your typed answers to the questions below using the department's Gitlab server by November 25, 2015 @ 11:59pm. Put your PDF into a folder named `theory_assignment6`.

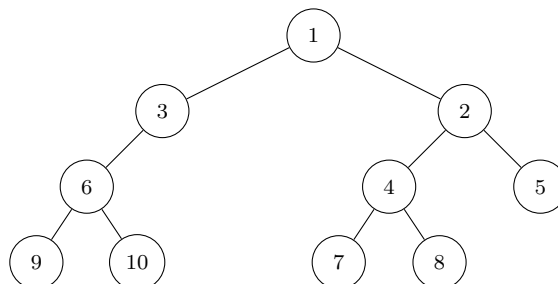
Note that your answers to problems 1-3 must include an explanation. The final number alone will not receive full credit.

1. There are four different roads between town A and town B, three different roads between town B and town C, and two different roads between town A and town C.
 - (a) How many different routes are there from A to C altogether?
 - (b) How many different routes are there from A to C and back (any road can be used once in each direction)?
 - (c) How many different routes are there from A to C and back in part (b) that visit B at least once?
 - (d) How many different routes are there from A to C and back in part (b) that do not use any road twice?
2. There are six different French books, eight different Russian books, and five different Spanish books. How many ways are there to arrange the books in a row on a shelf with all books of the same language grouped together?
3. A pair of six-sided dice are loaded. The probability that a 4 appears on the first die is $2/7$, and the probability that a 3 appears on the second die is $2/7$. Other outcomes for each die appear with probability $1/7$. What is the probability of 7 appearing as the sum of the numbers when the two dice are rolled?
4. For the following trees, give a level-order traversal (another name for a breadth first search), a pre-order traversal, an in-order traversal, and post-order traversal for the given tree.

(a) $T_1 =$



(b) $T_2 =$



(c) $T_3 =$

