WHAT TO LEARN FOR THE EXAM?

... basically everything we did in the course, with some exceptions. So, in more detail:

- You should be able to define any concept introduced in the lectures; this entails being familiar with the standard notation for these concepts.
- You should be able to explain and use all algorithms from the lectures (that is, the algorithm transforming between a labelled tree and its Prüfer sequence, Prim, Kruskal, Dijkstra, Ford-Fulkerson, breadth-first search, and the greedy colouring algorithm). This includes proofs of their correctness for Prim and Kruskal.
- You should be familiar with the lemmata, propositions and theorems from the lectures, and you should be able to apply these. If the theorem has a name attached to it, you should be able to state it. Exceptions are Zorn's lemma, Chvátal's theorem (on Hamiltonian degree sequences), the part of L13 dealing with spectral graph theory, Szemerédi's regularity lemma (including the "key lemma"), and the details about the evolution of $G(n, p)$.
- You should be able to prove the important theorems (i.e. those with a name attached) that weren't already excluded in the previous bullet point. Some proofs are too long to be reasonably asked for in an exam, so the exceptions are: The matrix-tree theorem, Tutte's 1-factor theorem, Brooks' theorem, the Erdős-Stone theorem, and Bollobás' theorem (and, of course, any named theorem that was not proven in the lectures).
- You should be familiar with recurring techniques and arguments, such as arguments based on the existence of a longest path/largest cycle/... or the probabilistic method using sums of indicator random variables for $G(n, p)$.

Besides reproducing results from the lectures, the exam will ask you to apply said results to examples; and use your knowledge to prove small results you (likely) haven't encountered before. For this, familiarity with the arguments and proofs in the lectures is often helpful.

The exam will consist of 5 problems worth 8 points each. No aids are allowed. You might find it helpful to bring some colours; however, please abstain from using red.

Recall that you need to obtain at least 18 points to pass the exam, and that you also need at least 27 points from the homework assignments to pass the course.