Guidelines for Reading a Scientific Paper

Reading and understanding a scientific paper can often be challenging, especially since the authors are often forced to squeeze a lot of content in a relatively small number of papers. The goal of this guide is to help students familiarize themselves with the art of reading scientific papers.

General rules:
1. First read the entire paper once without paying too much attention to all the finer details, so that you can get an idea of what the topic and the goal of the paper is.
2. Read the paper a 2nd time more carefully. This time around you should be able to understand the method well enough to try implementing it.
3. If you lack some of the background knowledge to understand the presented work, a good starting point is either a book on that topic, or a survey or seminal paper referenced by the current article.
4. By the time you are finished reading the paper you should be able to provide a summary of the work.

An important aspect is to be able to critically discuss the paper with colleagues. You should be able to scientifically argue about your opinion on the different aspects of the paper. That means no monosyllabic answers (yes, no, maybe), no "I just don't like the paper", no "it doesn't feel that it would work", no "it's a great paper because the author is my buddy", etc.

Questions that should be addressed in a critical discussion.
1. What are the contributions of the paper?
2. List the most prominent positive and negative aspects of the paper.
3. Is the work clearly presented?
   - Is the goal of the paper clear?
   - Is the work well-motivated?
   - Is the paper focused, or does it seem to wander between topics?
4. Is there sufficient amount of information provided to implement the algorithm?
5. Did you notice any errors in the mathematics, models, or assumptions used in the paper?
6. Is the method rigorously evaluated?
   - Is the method evaluated on a large number of data?
   - Is there quantitative error analysis?
   - Is the impact of the various parameters of the method evaluated and/or discussed?
   - Is the method comparatively evaluated with the state of the art?
7. Do you find the proposed work innovative?

Questions for fun:
1. Did you enjoy reading the paper?
2. Do you think you will use this method if you are dealing with a similar problem?
3. Did the paper inspire you, in the sense that, if you had the time, you would like to try out the proposed work.