Final Projects:

**General Guidelines & Project Deliverables**

**Deliverables and how to submit:**

* Projects are to be done in teams of two. (There will be at most one exception, i.e., team of three, due to total class size / # of students.) Once you picked a teammate and confirmed it with me, there will be no changes. Once you either proposed a project topic and I approved, or you picked a topic from my list and I confirmed, no further changes are allowed to the project topic, either.
* Projects are to be submitted to me (Instructor) via email, and cc-ed to your teammate(s) and the TA. A single zipped file/archive should contain everything (see below for the specifics), with a single exception of each teammates individual one-pager to the instructor on personal experience (also described in more detail below).

Your submission (zipped file/archive) should contain at the very least the following components:

* a brief (1-2 pages in Word or similar) summary of the project;
* what computational problem you are solving;
* what algorithmic technique(s) you are using;
* what kinds (and sizes) of inputs you are testing on algorithm on;
* the code itself (all the files containing any parts of your implementation, incl. if applicable any external code as long as you properly acknowledge its source)
* the output on a few small test cases;
* the analysis of your implemented algorithm’s performance/behavior; and
* a brief plain-English discussion (key findings, summary of performance evaluation, what you have learned, what may have gone wrong, overall conclusion).

More details:

* Many projects request that you do a comparison of typically either two or three related algorithms (different ways of accomplishing the same task, e.g. matrix multiplication). If so, you need to do a comparative analysis, which should include i) plots or tabulated results of relative performances of the algorithms you are comparing, and ii) a brief English summary/discussion of your findings -- for example, which algorithm ran faster on which inputs; were relative performances in accordance with theory or not (and why not); how did relative performances esp. run times change as input sizes were grown; did you test on just one input of each size or on several, and then did some averaging, etc. (If you are unsure what kind of analysis is suitable for your project, ask/email me!)
* Even the projects with just a single algorithm should have some analysis, on algorithm’s efficiency (run-time; how many basic operations such as multiplications or pairwise comparisons are performed) as a function of input size. Even for a project such as Tic-Tac-Toe, one can look into # of possible positions (and therefore games your program would have to explore) if you generalize from 3x3 to nxn board, and treat n as a parameter. So, virtually all projects need to have some analysis component using tools you learned earlier in the semester; that said being, obviously a project asking you to compare three different algorithms on several different input sizes will have a bigger performance analysis component than algorithm to implement tic-tac-toe.
* Remember: your analysis and project summary should include both i) performance plots (or tables) with quantitative evaluation of performances (run times on a particular machine; # of basic operations executed as a function of the input size) and ii) a brief (half a page to a page generally should suffice) plain-English summary of performances and key findings from your simulations/running your implementation on several non-trivial test cases. (Tic-tac-toe is the only exception, with minimal analysis expectations per the previous bullet-point.)
* When putting the execution times into a plot or a table, you should include information on which hardware you ran those simulations (the platform, operating system, info on CPU/processor, info on size of RAM memory). This is a good practice to follow in all projects that involve quantitative results and/or analysis of performances (cf. speed but really any quantitative performance evaluation).

All of the above is a part of your **team project** and should be submitted just once, by one of the members, on behalf of both teammates (always remember to keep your teammate in Cc: ) The only part that each of you is to submit separately and individually, is a 1-page summary of the following:

1. what specifically did you (a single person, not a team) individually do within the division of tasks between the two team members;
2. what you liked about doing the project as a team of two and in particular working with the specific teammate; and (just as importantly!)
3. what would you consider doing differently if (s)he were to do a similar project again, as a team of two (with the same or different teammate).