**Homework 1**

Homework 1 **pairs** are due by 11:59pm CST Thursday, January 19th, 2017.
Homework 1 **itself** is due by 11:59pm CST Tuesday, January 24th, 2017.

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If you run into wiki access permissions, email TA Wayne Wu <yuwu4@illinois.edu>

Some links on this page may appear broken until you sign in (at top right corner).

This page in a nutshell:

- This homework is worth 10 points.
- Pair up, and create a subpage over at Homework 1 Pairs.
- On the subpage you created, write your project proposal, following the sample given.
- The staff will select some proposals to proceed to the next stage.
  - Even if your project is not selected, you can still get full points on this assignment as long as your proposal satisfies all requirements.
- Pairs whose proposals are selected become team leaders and are in charge of recruiting for the 8-student team.
  - Team leaders can accept or reject other people into/from the team, in good faith;
  - Team leaders are allowed to abandon their own projects, and pursue a different project.
- Your project proposal is not set in stone; things change and we're okay with that.
- If you need some inspiration for projects, we've provided a few examples below.

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**Project Proposals**

At the end of the previous semester, Prof. Darko Marinov (instructor of CS427) told you to think about project ideas. If you already came up with ideas, or implemented some prototypes that's great. If not, start coming up with ideas right away.

The following candidate projects, more precisely project themes instead of concrete projects, can be considered. **Note that these candidate project themes don't have a project contact but you shall free to discuss with Prof. Xie related to these project themes.**

- **Project Theme 1.** Smart bus apps leveraging APIs provided by Champaign-Urbana Mass Transit District App Garage. Below are some resources:
  - MTD Developer Resources
  - MTD App Garage
  - Another Open Source App (currently not leveraging MTD API yet): OneBusAway
  - Here are related papers on this type of smart transportation apps/systems (the list will be expanded soon so check this wiki page for related papers later for more related papers/resources). These papers can give you some ideas on what features you would like to develop for this type of smart transportation apps/systems based on the APIs provided by Champaign-Urbana Mass Transit District App Garage.
- **Project Theme 2:** mHealth Apps
  - For example, there are open mHealth APIs available to leverage.
  - Here is a related paper published by researchers from our department:
    - Security Concerns in Android mHealth Apps. Dongjing He, Muhammad Naveed, Carl A. Gunter, and Klara Nahrstedt. A MIA Symposium, Washington DC, November 2014
- **Project Theme 3:** Lab of Things
  - Microsoft Research releases the Lab of Things SDK (which is open source). Based on it, you can develop software that uses connected devices in homes and beyond.

However, you are not limited to the above scope of candidate projects or project themes, and you are welcome to propose your own. **Note that multiple later-formed teams can separately work on the same project (theme) picked from the above candidate projects/project themes.**

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**Pairing up**

For this assignment, you will be working in pairs. If you already have a partner that you worked with to come up with an idea, or you want to partner with a specific student, create a page as described in Homework 1 Pairs by 11:59pm CST on Thursday, January 19. Anybody whom we have not heard from will be randomly assigned into pairs after the lecture on Thursday, January 19. (You won't lose any points for being randomly paired up.) Those students who are randomly paired up by us will also need to create a wiki page as described in Homework 1 Pairs. The page for each pair will serve as the place where the project proposals are posted.
Writing a project proposal

None of the things you write in your project proposal is set in stone for the rest of the semester. You are allowed to make modifications later (if your project gets accepted and if students are interested in joining it). In particular, the specific user stories you do each iteration will almost certainly change. The purpose of writing them down now is to make sure that you think about how much work is needed.

Put as much information as you can into the proposal. This gives other students more information about the project, and will help them determine if they are interested in it. In addition, a fleshed out proposal helps the staff decide if the project is feasible or not.

Keep everything on the same page. Use headers/sections to separate each issue.

Your proposal should be posted on the wiki page you created above as a pair. In your proposal, you must include the following sections in this order (e.g., you can copy the structure from sample12_page123):

1. Description

Give a couple of sentences – 4 sentences maximum – describing this project and what it does. If your project solves a specific problem, describe the problem here. This is the first thing that will be read, so make sure that it is clear, concise, and gives the gist of the project.

Reducing a project to four sentences can be hard. If you are having problems, you can write a four-sentence description as follows. The first sentence states the problem. The second states why the problem is a problem. The third is a startling sentence. The fourth states the implication of the startling sentence. As an example, a description for the Piazza website would be:

*Students need to communicate effectively with each other and with the instructor for active learning. They currently do so through emails which is cumbersome. Piazza is a website that offers an effective means for such communication. Piazza could greatly improve the learning environment.*

2. Motivation

Describe why you are doing this project. Describe why the project is interesting. If you are not passionate about this project, you probably should not be doing it.

3. Comparison with similar software

List similar software and describe how your proposed software would differ from those you have listed.

4. Programming language(s), libraries, frameworks, platforms

List the languages that you think you will be using and justify your choice. You can make this project multi-lingual. In addition, if there is a specific version of the language that you want to use, please state it: e.g. C# 4.0, Java 1.7, etc.

Also list the libraries, frameworks, etc. that you will be using. If you will be building upon some open-source project, list that here too. Put down the platform that your project will run on: Windows, Linux, OS X, web, Android, etc. or all/some of them.

5. Risks/Challenges

Enumerate the challenges inherent in your project.

General examples:

- learning a new language (e.g., Erlang is not for the faint of heart?)
- using a new framework, getting the framework to install, etc. (e.g., are you familiar with Ruby on Rails?)
- requiring specialized hardware (e.g., access to big parallel computer)
- cross-platform compatibility (e.g., Firefox AND IE?)
- new or untested ideas (e.g., research is fun, but risky)
- hard to meet requirements (e.g., is it possible to raytrace at 60 frames per second?)

Your proposal should be specific. Also list ways to mitigate the risks, if possible.

6. User stories and iterations

Describe at least 4 iterations of the project. Each iteration should be 2 weeks. Make sure that each user story describes something that is well-defined and accomplishable.

If you are planning on learning a new language or framework, do not just put that down; that is not a sufficient description. Instead, put down goals such as learn Ruby by doing the Sudoku Solver puzzle on [http://www.rubyquiz.com/quiz43.html](http://www.rubyquiz.com/quiz43.html). That way you actually have something to deliver. And we can actually tell that you have accomplished something.

At this point, planning will mostly be guesswork, but being specific (despite the uncertainty) will help you better understand the project.
7. Meeting schedule

Describe how many hours you think this project requires for it to be completed by the end of the semester for a team of about 8 students. Make a schedule of when you plan to meet to fulfill those hours each week. A good rule of thumb is to spend at least 6 hours each week. If you list more availability, you have a higher chance to attract other students to your project.

8. Skill sets

Describe the skills that you and your partner will be contributing to the project. Also, list the skills that you would like students who are interested in joining your project to have.

9. Process

Describe the process that you want to follow for developing your project. By default, your team will follow XP as in cs427. But you can propose specific changes on XP that you would like to make.

10. Tools

List the tools you would like to use. You should plan which tools you're going to use at least for these:

- Version control (by default we will use SVN at https://subversion.ews.illinois.edu/svn/sp16-cs428 but you may prefer GitHub or something else)
- Project management (by default we will use this Wiki, but you can propose some issue tracking system or task management systems such as Trello)

You're also welcome to propose other tools, e.g., IDE (if you don't want Eclipse) or online chat (if you don't want all team meetings to be physical, e.g., may consider http://www.cites.illinois.edu/illinoischat).

11. Related proposals, if any

If you are already considering a bigger team of about 8 students and writing related proposals, mention the NetIds of the other team members who are also submitting related proposals. Note that each pair will have to submit their own proposal.

Grading

This assignment is worth 10 points. We will be grading you based on how well you address the issues above. Use your experiences from the past semester and reflect on them to help you determine the important issues that you need to address. What were some of the problems that you faced and how would you address them this time in your own projects? What were some tools that you really liked/hated and which would you choose this time around? What are some of your strong skills and what other skills would complement the ones that you have?

Submission

The staff will be looking through the project proposals right after the due time and will accept or reject each of them. If you are really interested in your project, make the proposal compelling and convincing so that it will be accepted.

Some reasons for rejection include:

A project that is too complex for most of the students – so you will have trouble getting team members

A project that is hard to write automated tests for

A project that is too easy and does not require a team of about 8 students working for about 12 weeks

A project that is almost identical to something that has already been implemented over and over again. Projects that are likely to be rejected include Address Book applications, Chat applications, Campus bar finder, etc.

Please note that even if your project is rejected, you are still able to get full points for the proposal based on how well you address the issues.

Just because you propose a project doesn't mean that you need to stick with it. You can abandon your proposal and join a different team as well. And if someone likes your idea, they can always become the leader for the project you initially proposed.

Afterwards

The list of approved projects will be posted on the wiki, and we'll then start the process of helping create teams with CATME. Students should contact the project leaders (usually the students who proposed the idea) of a project which they are interested in. Project leaders can express their preferences on which students they prefer to have on their team in the CATME survey. Some good reasons for not preferring a student include:

- Not having the required familiarity with the technology that the team will be using.
- Not having a compatible meeting schedule with the rest of the team members.

The new member would not provide diversity for the team; while the team leaders may prefer to choose students with similar experience as the leaders, you also need some diversity (e.g., if everyone in your team wants to develop code but no one wants to test, manage, update Wiki, write documentation, etc. then your team is not diverse enough and you could have problems)
Your project proposal is not set in stone! You will be allowed to change it as the semester progresses. The purpose of this assignment is to get you to think about and document as much of it as possible so that you have a plan of what needs to be done.