Pair Programming in CPSC 301

Pair programming basics

When working on programming assignments, whether in lab or elsewhere, you will use the "Pair Programming" approach. In pair programming, two programmers share one computer. One student is the "driver," who controls the keyboard and mouse. The other is the "navigator," who observes, asks questions, suggests solutions, and thinks about slightly longer-term strategies. The two programmers switch roles about every 20 minutes. Working in pairs should make you much better at programming than would working alone. The resulting work of pair programming nearly always outshines that of the solitary programmer, with pairs producing better code in less time.

"[Pair programming] makes learning programming faster and more fun. I have had previous experience working both alone and with partners. I definitely agree that working with partners is more profitable." – CS student

To “learn the do’s and don’ts” of pair programming and to see pairs in action, view this entertaining video about pair programming An Introduction to Pair Programming for Students and this Fun with Pair Programming handout (both from North Carolina State University).

In order to get experience with a variety of partners, you should not work with any given partner for more than four labs. You are expected to find your partners. If you prefer not to choose your own partner or cannot find a partner, let your teaching assistant know; she or he will try to help you find a partner. You and your partner should note your partnership in your lab documents.

You will likely need to arrange times to meet outside of class. We expect everyone to be flexible and professional in arranging those times as necessary; if your schedule is highly constrained, explore possible meeting times with your prospective partner before you commit to the partnership.

Choosing your partners

Your partner may be in another lab section; however, both you and your partner must attend a single lab section together (if you are in different lab sections, you may go to either one). If it is absolutely infeasible for you to work with a partner you may work alone.

You should try to pick a partner whose experience and skill level with programming is similar to your own. This may not always be possible and it is sometimes hard to compare skill levels, but students tell us (and other data support) that pairs are most productive when the partners start at about the same level.

Still, people often pair up with another whose skills are different. This happens more often than not, as no two people have an identical skill set. The differences may be great or small, but this is exactly like most real-world working situations. Part of accomplishing a task is to get the most out of each member and make each member stronger and more productive on subsequent tasks.

Students bring different strengths to the process, regardless of how much experience they have had with programming. Both experienced and inexperienced students will need to draw on their reasoning and problem solving skills. A more experienced partner may sometimes feel frustrated or slowed down by a less experienced partner, but the experienced partner still benefits from the teamwork in many ways. The less experienced partner’s requests for clarification often uncover flaws in an approach or solution; the exercise of providing a clear explanation solidifies and deepens the explainer’s own understanding and the teamwork and communication skills they gain have great value in both the academic realm and the job market.
“My partner had never coded anything before so I was able to teach him a little bit about how it worked. The teaching bit helped me a lot with understanding the labs and passing the exams.” – CS student

The less experienced partner may feel that questions hold the other partner back or that there is no benefit to participating actively, but pair programming studies show that paired work is consistently better than work the stronger partner does alone. It is each partner’s job to understand the whole task; that means asking questions when necessary and answering them when possible.

**Dealing with differences**

If you believe your partner is not participating appropriately in pair programming (e.g., she or he often does not come to lab, does not keep in touch, or does not come to lab prepared to work) please first address your concerns to your partner, and try to agree on what should be done to make the pair programming experience work well for both of you. If that approach is not successful, explain the issues to your teaching assistant, who will work with you and your partner to improve the situation. As a last resort, you can always switch partners for the next lab.

**How pair programming affects your grade**

You and your partner should complete the core lab material together, and submit a single file archive through handin. Each member of the pair will receive the same score for these components of the lab. With material that is submitted for grading, the TA or instructor may request that the student appear in person to explain the contents of the submission before a grade is awarded, so you should not submit material on which you did not work or which you do not understand.

**Seek clarification**

Pair programming is shown to help, not hinder, your successful completion of the introductory course. It is important that you understand the processes and expectations up front so you can gain the most benefit. If you are unsure of any of the aspects of pair programming and how it is implemented in the course, see your instructor right away.

**Source**

This handout was adapted from material at the National Center for Women & Information Technology, and in particular the Pair-Programming-in-a-Box resource.