MAGNET ALGORITHMS AND DATA STRUCTURES
2015 - 2016
Samir Paul: samir.paul.teaching@gmail.com (samir_paul@mcpsmd.org)
mrpaul.net

Together, we'll learn the Java programming language and begin our study of algorithms, to be continued in Analysis of Algorithms. ADSA and ADSB will cover more than enough material to prepare students to take the AP Computer Science Exam on May 2, 2016, though some outside preparation will be required. This class is the prerequisite for Analysis of Algorithms and other upper-level computer science electives. Students in the accelerated group will begin Analysis of Algorithms after ADSB's formal material concludes.

TOPICS TO BE COVERED INCLUDE:

- History of Java
- Java Syntax and Style
- Data Types, Variables and Arithmetic
- Input/Output
- Boolean Expressions and if-else statements
- Iterative Statements: while, for, etc.

- Strings
- Methods
- Reading from and writing to files
- Exceptions
- Objects and Classes
- Class Hierarchies, Interfaces, Inheritance

- One-Dimensional Arrays
- Two-Dimensional Arrays
- Search
- Sort
- Recursion
- Collections

RESOURCES:

Java Methods A & AB is available for reference, though we will not follow this text in order. Java documentation is online at *docs.oracle.com*. We will use the integrated development environment Eclipse in the labs. Students should download and install the Java Software Development Kit and Eclipse on their home machines. There is also a Java compiler on binx. Students may use BlueJ or a comparably lean IDE on their personal computers. Many students enjoy using IntelliJ IDEA.

For AP exam prep, I recommend that students buy ONLY the Litvins' *Be Prepared for the AP Computer Science Exam in Java*. I will provide many resources from other texts, so do not spend money on them.

HELP:

If you are falling behind, ask for help before it is too late. I am available during 6th lunch by appointment and can stay after school with sufficient notice. The best way to arrange this help is via email or in person.

GRADING:

Assignments will include, although are not limited to, tests, quizzes, group assignments, projects, small/large programming assignments, written homework, instructional video viewing, and other homework. Please keep a record of your grades so that there will be no surprises.

    90 <= x <= 100 is an A;
    80 <= x < 90 is a B;
    70 <= x < 80 is a C;
    60 <= x < 70 is a D;
    x < 60 is an E.

Grades will be calculated using `pointsEarned/pointsTotal` with no categories.

I will occasionally allow reassessments. On those assignments, the grade from the retake will replace the original grade. These assignments will be selected by the teacher.

Each assignment will have a due date and a deadline. Unless specified otherwise, weekly problem sets will be due on Sunday nights, and the deadline will be 11:59pm on the following Tuesday. Programs or assignments submitted after the due date but before the deadline will lose 10%. I will occasionally grant extensions if you have a legitimate reason; don't suffer in silence. Send extension requests via e-mail by the actual due date, ideally even earlier.

If you are absent from a test, you must email me by the end of that school day. The email should explain to me why you are absent and when you intend to make-up the test. I will expect that make-up, unless there are extenuating circumstances, to occur within one day of your return.

ASSESSMENTS:
Tests and projects will always be announced well in advance. Quizzes may be unannounced. You will be responsible for not only material covered in class, but also any reading or video assignments completed at home. Reassessment will take place entirely at my discretion.

ACADEMIC HONESTY:
-Asking a classmate to explain a problem is acceptable; copying someone's work is not.
-Asking another student to help you fix a bug is acceptable; copying someone's code (by any means) is not.
(A good metric: Who is "driving" at the keyboard? On individual assignments, no other student should ever by typing at your computer or telling you what to type word for word. You should not be looking at anyone's code directly, whether on their screen or in an online repository.)
-Asking someone to tell you the questions on a test is NEVER acceptable; nor is looking on someone else's paper; nor is using a "cheat sheet."

Using someone else's work and passing it off as your own with or without the other person's knowledge will result in a loss of credit for the assignment/test/program. If one student shares his/her work with another student, both will forfeit credit for the work. In addition, your parents, other teachers, and the Magnet coordinator will be notified of the offense.

Introductory programming is distinctive in that there is a great wealth of online resources. You are highly encouraged to use those resources -- but not to refer to solutions you find online. While you may be tempted to copy internet solutions initially, you will find this approach unsustainable and will eventually have great difficulty tackling more complex problems -- on class tests, on large assignments on the AP exam, and beyond. **I encourage you to approach each problem set as an opportunity to develop strong "coding" instincts and to allow your mind to work through the problem-solving process.**

COMPUTER ACCESS:
You will be expected to work on programming assignments both at home and in class. If you do not have access to a computer at home, please see me as soon as possible so that we can make arrangements.