

# AP Computer Programming A-B

School Year: 2017-2018

Certificated Teacher:

Desired Results
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Course Title: AP Computer Programming/Science

Credit: \_\_\_\_ one semester (.5) \_\_\_x\_\_\_ two semesters (1.0)

Prerequisites and/or recommended preparation: *Algebra I*

**Estimate of hours per week engaged in learning activities:**

5 hours of class work per week per 18 week semester

**Instructional Materials:**

All learning activities (resources, assignments, assessments) are contained within or referenced in the student's online course. The online course is accessed via login and password assigned by student's school (web account) or emailed directly to student upon enrollment, with the login website.

**Other resources required/Resource Costs:**

*BPJ\_TextBook by Charles E. Cook (pdf) (provided)*

*JCreator LE (provided)*

*Curent JRE from Sun Systems (provided)*

*Graphical Labs (BPJ) by Charles E. Cook (pdf) (provided)*

*AP07\_gridworld\_Studmanual (pdf) (provided)*

*Blackboard Account (provided)*

**Course Description:**

AP Computer Science provides instruction in the use of the JAVA programming language to design, write, and analyze programs, along with the case study, in preparation for the AP Computer Science exam.

**Enduring Understandings for Course (Performance Objectives):**

- design and implement solutions to problems by writing, running, and debugging computer programs.
- use and implement commonly used algorithms and data structures.
- develop and select appropriate algorithms and data structures to solve problems.
- code fluently in an object-oriented paradigm using the programming language Java. Students are expected to be familiar with and be able to use standard Java library classes from the AP Java subset.
- read and understand a large program consisting of several classes and interacting objects. Students should be able to read and understand a description of the design and development process leading to such a program. (An example of such a program is the *AP Computer Science Case Study*.)
- recognize the ethical and social implications of computer use.

**Course Learning Goals (including WA State Standards, Common Core Standards, National Standards):**

C2—The course includes all of the topics listed in the “Computer Science A” column of the Topic Outline in the AP Computer Science Course Description.

C3—The course teaches students to design and implement computer based solutions to problems in a variety of application areas.

C4—The course teaches students to use and implement commonly used algorithms and data structures.

C5—The course teaches students to develop and select appropriate algorithms and data structures to solve problems.

C6—The course teaches students to code fluently in an object-oriented paradigm using the programming language Java. The course teaches students to use standard Java library classes from the AP Java subset delineated in appendices A and B of the AP Computer Science Course Description. (Note: Students who study a language other than Java in AP Computer Science must also be taught to use Java, as specified in the AP Java subset.)

C7—The course teaches students to read and understand a large program consisting of several classes and interacting objects, and enables students to read and understand the current AP Computer Science Case Study posted on AP Central.

C8—The course teaches students to identify the major hardware and software components of a computer system, their relationship to one another, and the roles of these components within the system.

C9—The course teaches students to recognize the ethical and social Implications of computer use.

**Evidence of Assessment**

*What evidence will be collected to determine whether or not the understandings have been developed, the knowledge and skill attained, and the state standards met? [Anchor the work in performance tasks that involve application, supplemented as needed by prompted work, quizzes, observations, and assessments]*

**Performance Tasks:**

*Students will read and practice small pieces of a larger target. The students will then take quizzes and complete projects that may involve several of these pieces. Students will also take Unit Tests which span several quizzes. Throughout these process students, will blog about their debugging process and communicate solutions to their peers.*

**Other Evidence (self-assessments, observations, work samples, quizzes, tests and so on):**

- **Work on a portfolio**
- **Quizzes and Tests through blackboard**
- **Blogging**
- **Exercise submissions through blackboard**
- **Project submission**

**Other evidence that will be collected to show student understanding will be individual self-assessments for each unit as well as reflections on discussion board dialogue/questions with the class. There will be in-person proctoring for end of unit tests.**



## Types of Learning Activities

*Indicate from the table below all applicable learning strategies that may be used in the course.*

Direct Instruction	Indirect Instruction	Experiential Learning	Independent Study	Interactive Instruction
<input type="checkbox"/> Structured Overview <input checked="" type="checkbox"/> Mini presentation <input type="checkbox"/> Drill & Practice <input checked="" type="checkbox"/> Demonstrations <input type="checkbox"/> Other (List)	<input checked="" type="checkbox"/> Problem-based <input checked="" type="checkbox"/> Case Studies <input checked="" type="checkbox"/> Inquiry <input checked="" type="checkbox"/> Reflective Practice <input checked="" type="checkbox"/> Project <input type="checkbox"/> Paper <input type="checkbox"/> Concept Mapping <input type="checkbox"/> Other (List)	<input type="checkbox"/> Virt. Field Trip <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Simulations <input checked="" type="checkbox"/> Games <input type="checkbox"/> Field Observ. <input type="checkbox"/> Role-playing <input type="checkbox"/> Model Bldg. <input checked="" type="checkbox"/> Surveys <input type="checkbox"/> Other (List)	<input type="checkbox"/> Essays <input checked="" type="checkbox"/> Self-paced computer <input checked="" type="checkbox"/> Journals <input type="checkbox"/> Learning Logs <input type="checkbox"/> Reports <input type="checkbox"/> Directed Study <input checked="" type="checkbox"/> Research Projects <input type="checkbox"/> Other (List)	<input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Debates <input type="checkbox"/> Role Playing <input type="checkbox"/> Panels <input type="checkbox"/> Peer Partner Learning <input checked="" type="checkbox"/> Project team <input type="checkbox"/> Laboratory Groups <input checked="" type="checkbox"/> Think, Pair, Share <input type="checkbox"/> Cooperative Learning <input type="checkbox"/> Tutorial Groups <input type="checkbox"/> Interviewing <input type="checkbox"/> Conferencing <input type="checkbox"/> Other (List)
<p><b>Other:</b></p> <p style="padding-left: 40px;"><b>Each Unit follows the same sequence.</b></p> <p style="padding-left: 80px;">Read a section and practice in JCreator LE.                      Blog about bugs, errors and other questions.                      Complete the exercise.                      Complete a review quiz.                      Complete a project.                      Test.</p>				

## Learning Activities

*Learning activities (as provided in the student friendly course schedule posted in online course) and contains the scope and sequence of performance tasks, activities and assessments by semester, unit, and weeks.*

These learning activities are aligned with the successful completion of the course learning goals and progress towards these learning activities will be reported monthly on a progress report.

### **1<sup>st</sup> Semester Computer Programming/Science Learning Activities**

#### **Unit 1: Introduction to Java**

**Duration: 5 weeks**

**Student Learning Targets:**

- I can initialize, declare and manipulate primitive data types.
- I can use Strings? They aren't primitive but they are the next best thing.
- I can use methods in the Math class, and the scanner class.

**Learning Activities:**

**Week 1**

## Unit 1 An Introduction to Java

Read/Notes/Quiz Lesson 1

Read/Notes/Exercise/Quiz Lesson 2

### Week 2

Read/Notes/Exercise/Quiz Lesson 3

Read/Notes/Exercise/Quiz Lesson 4

### Week 3

Read/Notes/Exercise/Quiz Lesson 5

Project 4-1 "Cheating on your Algebra Assignment"

Project 5-1 "Mixed Results"

### Week 4

Read/Notes/Exercise/Quiz Lesson 6

Read/Notes /Quiz Lesson 7

Project 7-1 "Circles"

### Week 5

Read/Notes/Exercise/Quiz Lesson 8

Test #1 Lessons 1-8. **STUDY YOUR NOTES.**

*(You need to move on to unit 2 this week)*

## Unit 2: Going with the Flow

**Duration: 4 weeks**

### Student Learning Targets:

- I can use Logical arguments: if, switch, for, and while.
- All information can be reduced to bits.

### Learning Activities:

#### Week 6:

Unit 2 Going with the Flow.

Read/Notes/Exercise/Quiz Lesson 9

Read/Notes/Exercise/Quiz Lesson 10

Project 10-1 "Weight on Other Planets"

#### Week 7:

Read/Notes/Exercise/Quiz Lesson 11

*Bottles of Root Beer song...30 →1*

Read/Notes/Exercise/Quiz Lesson 12

#### Week 8

Read/Notes/Exercise/Quiz Lesson 13

Read/Notes/Exercise/Quiz Lesson 14

*Loopy WS [nested loops]*

Test #2 Lessons 9-14. **STUDY YOUR NOTES.**

## Unit 3: An Introduction to Things (objects)

Duration: 5 weeks

### Student Learning Targets:

- I know what an object is.
- I can use an array to solve problems.

### Learning Activities:

**Week 9 Unit 3 An Introduction to Things**

Read/Notes/Exercise/Quiz Lesson 15

**Week 10**

*Old McDonald Song Project [class animal]*

Project "Overdrawn at Bank" 15-1

Read/Notes/Exercise/Quiz Lesson 16

**Week 11**

Read/Notes/Exercise/Quiz Lesson 17

Read/Notes/Exercise/Quiz Lesson 18

**Week 12**

*Encryption Project...*

Read/Notes/Exercise/Quiz Lesson 19

Read/Notes/Exercise/Quiz Lesson 20

**Week 13**

*Encryption Project time (See course materials folder)*

Test #3 Lessons 15-20 STUDY YOUR NOTES.

## Unit 4: File Reading/Writing

Duration: 4 Weeks

### Student Learning Targets:

- I can use the IO stream with scanners to import/export text files.
- I can you handle any formatting issues that may arise.
- I can you use random numbers.

### Learning Activities:

**Week 14: Unit 4 File Reading/Writing**

Read/Notes Exercise/Quiz Lesson 24

Read/Notes/Quiz Lesson 25

**Week 15**

Read/Notes/Quiz Lesson 26

Read/Notes/Exercise/Quiz Lesson 27

**Week 16**

Read/Notes/Exercise/Quiz Lesson 30

Project 25-2 Student Averages

**Week 17**

Project 30-3 Monte Carlo Technique

Test #4 Lessons 24-27,30.

## **2<sup>nd</sup> Semester AP Computer Programming B Learning Activities**

### **Unit 5: Review of Java Tools using the BugLabs**

**Duration: 5 Weeks**

#### **Student Learning Targets:**

- I can describe how the case study program works
- I can understand the basic elements of the case studies' code.
- I will have a deeper understanding of Boolean, switch loops, objects, and arguments in the constructor, comparing objects, scanner, String array, static variables, writing to a file, random numbers.

#### **Learning Activities:**

##### **Week 1: Install Bug Jar**

**Bug Lab 1/journal entry**

**Bug Lab 2/journal entry**

**Bug Lab 3/journal entry**

##### **Week 2:**

**Bug Lab 4/journal entry**

**Bug Lab 6/journal entry**

**Bug Lab 7/journal entry**

##### **Week 3**

**Bug Lab 8/journal entry**

**Bug Lab 9/journal entry**

##### **Week 4**

**Bug Lab 10/journal entry**

**Bug Lab 11/journal entry**

**Bug Lab 12/journal entry**

##### **Week 5**

**Bug Lab 14/journal entry**

**Bug Lab 17/journal entry**

***Unit 5 Test***

## **Unit 6: Advanced Java structures**

**Duration: 4 Weeks**

### **Student Learning Targets:**

- I can describe how the case study program works.
- I can understand the basic elements of the case study.
- I can solve problems and modify the case studies' code.
- Have a deeper understanding of Arrays, Selection Operations, Inheritance, Exceptions, and Interface.

### **Learning Activities:**

#### **Week 6**

**Read/Notes/Exercise/Quiz Lesson 33**

**Bug Lab 18/journal entry**

**Read/Notes/Exercise/Project: Pass Gravy/Quiz Lesson 34**

#### **Week 7**

**Read/Notes/Exercise/Quiz Lesson 35**

**Bug Lab 19/journal entry**

**Read/Notes/Exercise/Quiz Lesson 36**

#### **Week 8**

**Bug Lab 20/journal entry**

**Bug Lab 21/journal entry**

#### **Week 9**

**Read/Notes/Exercise/Quiz Lesson 37**

**Read/Notes/Exercise/Quiz Lesson 38**

**Bug Lab 22/journal entry**

***Unit 6 Test***

## **Unit 7: Processing Piles**

**Duration: 3 Weeks**

### **Student Learning Targets:**

- I can describe how the case study program works.
- I can understand the basic elements of the case study.
- I can solve problems and modify the case studies' code.
- I will have a deeper understanding of Recursion, Sorting Routines, List Interface, Array List and Iterators/List. Iterators



**Learning Activities:**

**Week 10**

Read/Notes/Exercise/Quiz Lesson 40  
Bug Lab 23/journal entry

**Week 11**

Read/Notes/3 sort Exercises/Quiz Lesson 41  
Read/Notes/Exercise/Quiz Lesson 42  
Read/Notes/Exercise/Project: Big Bucks/Quiz Lesson 43

**Week 12**

Read/Notes/Exercise/Quiz Lesson 44  
Bug Lab 24/journal entry  
Bug Lab 27/journal entry  
*Unit 7 Test*

**Unit 8: Independent Project**

**Duration: 3 Weeks**

**Student Learning Targets:**

- I can describe how the case study program works.
- I can understand the basic elements of the case study.
- I can solve problems and modify the case studies' code.
- I will have a deeper understanding of Objects, Inheritance, polymorphism, and method overloading.

**Learning Activities:**

**Week 13**

Case Study Set 1-3  
Case Study Set 4-6

**Week 14**

Case Study Set 7-9  
Case Study Set 10-12

**Week 15-18**

**Make Your Own: Submit a project plan.**  
**Time to work on project.**  
**Submit final project.**

