AP Computer Science A

Second Semester

AP Exam Preparation and Spring Projects

Standards Mastery Framework/Flex Timing Prototype Semester

12 Weeks

Executive Summary

With the exception of the final Master Project, any signoff can be completed *at any time*. It is, however, <u>strongly recommended that they</u> be accomplished in order.

Students will create a ½" White binder with cover sleeve which will contain all of their papers and code printouts, organized in order. This will be submitted for an EXAM grade. *Details provided in class*.

All S (small) assignments are considered normal coursework
All M (medium) assignments are Quiz grades*
All L (large) assignments are EXAM grades*
Grades will be assigned for Quizzes and Exams Individually

All **T** items are development team items.

All assignments will be given a rating of 1-4 for mastery as follows:

1: Student only understands most basic definitions/concepts. Cannot demonstrate mastery

2: Student can show limited understanding of the definitions/concepts with assistance

3: Student has mastered the definitions/concepts and can perform assigned tasks to standard(s)

4: Student has mastered and exceeded the standard by performing and demonstrating skills beyond what has been explicitly taught and/or required

Signoffs will be assigned on the software program as follows:

Blank/0: No signoff/Not Attempted/No Credit

Red: 1

Blue: 2

Silver: 3

Gold: 4

For purposes of this initial program, half points will not be awarded *Any irregularities on assessments are considered honor violations

Size	#	Task
S	1	Complete Online Unit 5. Write 1 PP on each question you get wrong.
S	2 T	Program and instantiate a class on a Raspberry Pi
S	3	Complete Online Unit 6. Write 1 PP on each question you get wrong.
м	4 T	Program and implement an interface in a program on a Raspberry Pi
S	5	Complete Online Unit 7. Write 1 PP on each question you get wrong.
S	6 T	Program a Raspberry Pi in Java to turn on an LED
S	7	Complete Online Unit 8. Write 1 PP on each question you get wrong.
М	8 T	Program a Raspberry Pi in Java to exercise an RGB LED
S	9	Complete Online Unit 9. Write 1 PP on each question you get wrong.
S	10	Complete Online Unit 10. Write 1 PP on each question you get wrong.
S	11	Write a 1-Page paper explain at least 10 things you must be careful of when you hand
		code. They must be personal to your hand coding. I will check for duplicates.
М	12 T	Write a program in a Raspberry Pi that uses multiple LEDs to respond to user input
S	13	Hand Code AP EXAM 2015 FRQ-2
S	14	Program and prove your hand-coding to FRQ-2
S	15	Write a 1-Page paper explain deviations and lessons learned from your hand code to
		proof code, to FRQ-2
L	16	Find three example FRQ questions and provide hand-coding solutions and proof coding
		backups. Write a 1-2 page paper examining your deviations/lessons learned. Submit
		entire packet.
S	1/	Hand Code AP EXAM 2015 FRQ-3
S	18	Program and prove your hand-coding to FRQ-3
S	19	Write a 1-Page paper explain deviations and lessons learned from your hand code to
NA	20	Hand Code, ID FRQ-5
141	20	a 1-Page paper explain deviations and lessons learned from your hand code to proof
		code, to FRO-4.
S	21	Print out Exam Appendix – Java Quick Reference for APCS-A Exam. Show printout to
		teacher and place in binder.
S	22	Program an example of all subset items in class java.lang.Object
S	23	Program an example of all subset items in class java.lang.Integer
М	24	Program an example of all subset items in class java.lang.String
S	25	Program an example of all subset items in class java.lang.double
S	26	Program an example of all subset items in class java.lang.Math
S	27	Program a new example of one subset item from each of 22-27 in a single new program.
М	28	Program an example of all subset items from interface java.util.List <e></e>
S	29	Write a class that models an object from your room at home
S	30	Write a class method that accesses each field (class you wrote for 29) NOT FROM USER
S	31	Write a class display method for the class you wrote and updated in 29-30
L	32	Write a container class to hold an arraylist of the class you produced in 29-31. Fill it with
		at least three objects using a routine to accept and validate user input for each object in
		the arraylist.
Μ	33	Write the Vigenere Cipher from CS50AP in Java
MASTER PROJECT		
Phase A		Submit detailed project proposal
Phase B		Checkpoint 1
Phase C		Checkpoint 2
Brosontation		Submit final project
& Defense		Project Presentation, Demonstration, and Defense

Specifications Details for Signoffs and Checkpoints

- 1. Complete online question Unit 5 (All). Write 1 PP for each question you get wrong.
- Program should be written on a Raspberry Pi. Must create and instantiate a custom class with at least 2 fields, standard documentation, multiple constructors, etc. as per class standards.
- 3. Complete online question Unit 6 (All). Write 1 PP for each question you get wrong.
- 4. Program should be written on a Raspberry Pi. Must create and instantiate a custom interface with at least 2 methods, standard documentation, etc. as per class standards. This obviously requires a class that implements it, done properly. Assessment (Quiz)
- 5. Complete online question Unit 7 (All). Write 1 PP for each question you get wrong.
- 6. Program a Raspberry Pi in Java to turn, on and off, an LED at programmer command. Must exit with Pi settings properly cleaned up.
- 7. Complete online question Unit 8 (All). Write 1 PP for each question you get wrong.
- 8. Program a Raspberry Pi in Java to activate and control each color of an RGB LED. **Assessment (Quiz)**
- 9. Complete online question Unit 9 (All). Write 1 PP for each question you get wrong.
- 10. Complete online question Unit 10 (All). Write 1 PP for each question you get wrong.
- 11. One-page paper discussing where your hand coding worked and fell short. Explain lessons learned in detail. Create a review guide for exam prep.
- 12. Program a Raspberry Pi to use multiple LEDs to respond to user input in some manner. **Assessment (Quiz)**
- 13. Hand Code. FRQ2 from 2015 Practice Exam.
- 14. Program and prove/disprove your hand code from FRQ2.
- 15. One-page paper discussing where your hand coding worked and fell short. Explain lessons learned in detail. Expand your review guide for exam prep.
- 16. Find 3 alternative practice APCS-A FRQ questions. Provide the questions. Hand Code the answers and provide the programmed code solutions and one-page lessons learned review as you have already completed twice. Expand review guide.

Assessment (Exam)

- 17. Hand Code. FRQ3 from 2015 Practice Exam.
- 18. Program and prove/disprove your hand code from FRQ3.
- 19. One-page paper discussing where your hand coding worked and fell short. Explain lessons learned in detail. Expand your review guide for exam prep.
- 20. Hand Code. FRQ4 from 2015 Practice Exam. Program and prove/disprove your hand code from FRQ4. One-page paper discussing where your hand coding worked and fell short. Explain lessons learned in detail. Expand your review guide for exam prep. Assessment (Quiz)

- 21. Print out Exam Appendix (B) "Java Quick Reference for APCS-A Exam." Show to teacher and insert into binder.
- 22. Program a use-case example of all subset items in class java.lang.Object. [2 methods] [Use appendix]
- 23. Program a use-case example of all subset items in class java.lang.Integer. [Integer wrapper, int, MIN_VALUE, MAX VALUE] [Use appendix]
- 24. Program a use-case example of all subset items in class java.lang.String. [5 methods, multiple versions for some] [<u>Use</u> appendix]. Assessment (Quiz)
- 25. Program a use-case example of all subset items in class java.lang.double. [Double, double] [Use appendix]
- 26. Program a use-case example of all subset items in class java.lang.Math. [abs (int & double forms, pow, sqrt, random] [Use appendix]
- Program a new example of one item from each of 22-26 in a new program.
- 28. Program a use-case example of all subset items in class java.util.List<E>. [6 methods][Use appendix].Assessment (Quiz)
- 29. Program a java class (external file) that models an item from your room at home.
- 30. Program a class method in the class you wrote for 29, that accepts user input, validates it, then puts it into an object of the class you created in 29.
- 31. Program a display method for the class you wrote in 29 that displays all fields of the class in structured and user-friendly readable output.
- 32. Write a container class that holds, as a field, an ArrayList of the class you created in 29. Fill it with at least three objects using a routine to accept and validate user input for each of object in the ArrayList in the container class. **Assessment (Exam)**
- 33. Port the Vigenère cipher from CS50 AP into Java. Assessment (Quiz)

JAVA Program

```
Must-includes (Graded Directly):
```

- \Box Abstract Class (1)
- \Box Interface (1)
- □ User Input (multiple)
- □ Output (Results, prompts, etc.)
- □ Full documentation including header
- □ Full example runs for majority of program states
- Must be meaningful code, that is on a subject unique to your personal interests. This is mandatory. Do not waste time writing code in which you are not interested.
- $\hfill\square$ Must at a minimum, store some information in an external file.

Project Enhancements:

- Program uses electronics/Raspberry Pi
- □ Program reads/writes from a text file
- Program reads/writes any format or ADS (abstract data structure) from a file
- $\hfill\square$ Program uses a database on localhost
- □ Program uses Swing or JavaFX
- Other (Preapproved)_____

Submission Notes to teacher:

By signing below, I certify that the code I have written is my own. No one else has written this code but me, and any help I have received has been for clarification/understanding alone. No one has formed any algorithms in this work product but me.

Name (Printed) Signature

Date

Spring Master Project Proposal

Class: APCS-A Period (Circle): 2-Schenk 5-Schenk

Name (FULL):_____

Executive Summary

Specifics to Assist in Project Approval

I understand that all code submitted under my Spring project must be of my own authoring. No one else may generate or otherwise write any algorithms for me. Any code submitted that is 3rd party will be presented to the teacher for prior approval if specific algorithms or libraries are required outside the libraries available in class as part of our normal lab work or language libraries provided.

Signature

Date

Project is:
Approved
Unapproved (See teacher) or
Approved as modified below

Spring Master Project Grading Checklist

Class: APCS-A

Period (Circle): 2-Schenk 5-Schenk

Name (FULL):_____

Java Program

Must-includes (Graded Directly):

- □ Abstract Class (1)
- \Box Interface (1)
- □ User Input (multiple)
- □ Output (Results, prompts, etc.)
- $\hfill\square$ Full documentation including header
- □ Full example runs for majority of program states
- Must be meaningful code, that is on a subject unique to your personal interests. This is mandatory. Do not waste time writing code in which you are not interested.
- □ Must at a minimum, store some information in an external file.

Project Enhancements:

- Program uses electronics/Raspberry Pi
- □ Program reads/writes from a text file
- Program reads/writes any format or ADS (abstract data structure) from a file
- Program uses a database on localhost
- □ Program uses Swing or JavaFX
- Other (Preapproved) ______
- Other (Surprise)_____

Assigned Grade: _____/____ = ____%

Teacher Notes: