17-356: Software Engineering for Startups

Spring 2020 Midterm Exam

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Name: _____

Andrew ID: _____

Instructions:

- Not including this cover sheet, your exam should have 9 pages in total. Make sure you're not missing any pages. Write your full name and **Andrew ID** on at least this page, if not all others.
- Write concise, careful answers. Short and specific is much better than long, vague, and rambling, and grading will reflect this. You have enough time to write clear and readable responses. Bullet points and phrases are acceptable. Spend time to consider how best to present your answers, including citing examples to make your points more concretely.
- Clearly indicate and write your answers in the space provided below each problem. We cannot give you points for answers we cannot find or read.
- The exam has 6 multi-part questions with a maximum score of 90 points. The point value of each problem is indicated. We planned the exam to allocate approximately one minute per point.
- You may consult one sheet of paper with notes. You may not use books, a calculator, cell phone, laptop, or any other electronic or wireless device.
- Good luck!

Question	Points	Score
Process and Architecture	32	
Design Critique	10	
Guest lectures	8	
Testing	20	
Viability	8	
Product	12	
Total:	90	

Question 1: Process and Architecture (32 points)

(a) (6 points) Consider the following user story:
"As a user, I want to use the Dronuts website to order donuts"
Identify two reasons this is a bad user story, according to INVEST principles.

(b) (8 points) Provide an example of an epic for the Dronuts project, then break it down into at least 3 user stories.

(c) (6 points) In the interest of deploying microservices, what are 3 advantages of deploying with containers over virtual machines?

(d) (2 points) What are two advantages of a microservice architecture?

(e) (2 points) What is a disadvantage of a microservice architecture?

(f) (8 points) Consider your engineering team and the features of your Dronuts application. How many microservices would you break your groups Dronuts application into? Explicitly list them. Justify why you would break up your application this way.

Writing below this line is permitted but discouraged.

Question 2: Design Critique (10 points)

(a) (6 points) For the following piece of design feedback, indicate whether it constitutes good/adequate/constructive feedback, or not. Justify your answer. Improve it if it can be improved

"I think the lower half of the UI is a bit too busy"

(b) (4 points) Describe the three phases of a studio design critique.

Writing below this line is permitted but discouraged.

Question 3: Guest lectures (8 points)

The following questions are based on our two guest lectures:

(a) (4 points) What is one suggestion Kelley Robinson gave for better communication as a developer?

(b) (4 points) What is one lesson Mike Ressler learned from his failed startup?

Writing below this line is permitted but discouraged.

Question 4: Testing (20 points)

Test Driven Development is a process of writing code, where a developer follows these steps:

- Write a failing test
- Write code to pass the test (but no more)
- Refactoring (if necessary)

In this question, you should demonstrate your ability to follow the TDD process at the pseudocode level. You should write code , and solve it using Test Driven Development.

For this task, you should develop a solution to to the fizzbuzz problem using the iterative TDD style.

Problem description: You should develop a function that takes a number. If the number is divisible by 3, you should print "fizz" If the number is divisible by 5, you should print "buzz" If the number is divisible by 5 and 3, you should print "fizzbuzz" Else print the number.

Example:
Test: `AssertThat( 0,0)`

Code:

```
FizzBuzz(i){
  return 0
}
```

(a) (5 points) First Iteration:
Test: `AssertThat(FizzBuzz(  ),  )`
Code: `FizzBuzz(i){`

(b) (5 points) Second Iteration:
Test: `AssertThat(FizzBuzz(  ),  )`
Code: `FizzBuzz(i){`

(c) (5 points) Third Iteration:
Test: `AssertThat(FizzBuzz(  ),  )`
Code: `FizzBuzz(i){`

(d) (5 points) Third Iteration:
Test: `AssertThat(FizzBuzz(  ),  )`
Code: `FizzBuzz(i){`

Writing below this line is permitted but discouraged.

Question 5: Viability (8 points)

Kuvee was a start-up that sold wifi-connected wine bottles. The wine came in metal cylinders that went inside of the bottle. The bottle had a touchscreen that gave information about the wine, and it enabled users to purchase more wine. Unfortunately, the start-up failed, and is no longer in business.

(a) (4 points) If you had been an engineer at Kuvee, what approach could you have suggested to evaluate the viability of your idea before building the entire hardware?

(b) (4 points) Assuming you found the idea to not be viable, the next step would be to pivot to a new idea and evaluate that. What new direction would you suggest for Kuvee to investigate?

Question 6: Product (12 points)

Provide two *bad* questions to elicit feedback for any element of the snow plow tracker idea. Explain why those questions are bad. Then, reformulate the question, providing two *good* questions for eliciting that same feedback.

(a) (6 points) First Question

- Bad question:
- Reason why it's a bad question:
- Good question:

(b) (6 points) Second Question

- Bad question:
- Reason why it's a bad question:
- Good question: