Problem Set 0 SOLUTIONS

CSCI E-5a: Programming in R

Let's clear the global computing environment:

```
rm( list = ls() )
```

Problem 1: Introduce Yourself

In this problem, you can tell us a little bit about your background and your tech setup.

Part (a): Course Name

Please list your official full name that you are registered under. Then tell us what name you would like us to use when we address you.

Solution

My official full name is "Theodore Hatch Whitfield". Please address me as "Hatch".

Part (b): Time Zone

Please tell us what time zone you are located in. What is the time difference from Boston, MA?

Solution

I'm located in Boston, which is Eastern Daylight Time (EDT), so there's no time difference for me!

Part (c): Programming Experience

You don't need to have any prior experience with coding in order to take CSCI E-5a, and in fact the course is designed as an introduction to computer programmers for beginners.

However, we would like to know if you've had any prior programming experience. If so, tell us a little about what you've done.

If you don't have any prior programming experience, hey, that's cool too. So don't be afraid to tell us that either.

Solution

I've been writing code for 30 years, working in Pascal, x86 assembly language, C, Excel VBA, SAS, Stata, R, Python, and even a few lines of Perl.

Part (d): Motivation

Why are you taking CSCI E-5a? Tell us about your motivation for enrolling, and what you hope to get out of the course.

Solution

I want to develop my skills in statistics, data science, and machine learning, and I need a comprehensive introduction to the fundamentals of probability theory.

Part (e): Operating System

What computer operating system are you using? Tell us if it's Windows, iOS, Linux, or something else, as well as the OS version.

Solution

I'm using Windows 10.

Part (f): Installation

How did the installation procedure go for you? Did you have any problems? Did you find the Module 3: Installing Software video helpful?

Solution

I was able to install all the required software easily without any problems. The video was great!

End of problem 1

Problem 2: The Honor Codes

In this problem, we'll review the two honor codes and agree to abide by them.

Part (a): Negative honor code

In the *negative honor code*, you promise to *not* do something: you promise not to cheat.

For CSCI E-5a, what that means is that all the work that you submit must be your own.

You are allowed to use and modify the code that I write for lecture and problem set solutions in your submissions.

For problem sets, you are welcome and encouraged to discuss the problems with fellow students, friends, and colleagues, but the final document that your submit must consist entirely of either your work or my code, possibly modified.

For exams, you must not discuss the problems with anyone else, and the final document that your submit must consist entirely of either your work or my code, possibly modified.

For this part, please write us a sentence declaring that you understand the negative honor code and agree not to violate it.

Solution

I understand the negative honor code, and pledge not to violate it.

Part (b): Positive honor code

The *positive honor code* is much more pleasant than the negative honor code.

In the negative honor code, you promised to *not* do something, so in the positive honor code you promise that you *will* do something.

You *will* work hard, more than just what you need to get a good grade in the course.

Instead, you promise to dig in, push yourself, and commit to excellence instead of just getting by.

For this problem, please write us a sentence declaring that you understand the positive honor code and agree not to violate it.

Solution

I understand the positive honor code, and pledge not to violate it.

End of problem 2

Problem 3: Canvas Website

In this problem, we'll explore the course website.

First, please watch the *Module 2: Canvas Website* video.

Part (a): Current Week ZIP Bundle

Where is the link for the current week ZIP bundle?

Solution

The link for the current week ZIP bundle is the second link from the top of the Canvas Home page, under the Current Week section.

Part (b): Complete Problem Set Solutions ZIP Bundle

Where is the link for the Complete Problem Set Solutions ZIP Bundle located?

Solution

The link for the Complete Problem Set Solutions ZIP Bundle is the third link from the top of the Home page, under the Current Week section.

Part (c): Submitting Assignments

What is the name of the system that we use for grading assignments? Where is the link for this system located?

Solution

We use the Gradescope grading system for all assignments. The link for Gradescope is located in the left-hand course navigation menu, second from the bottom.

Part (d): Reviewing Grades

Where can you see all your combined course grades? Where is the link located?

Solution

We use the Canvas Grades page to report combined course grades. The link for the Canvas Grades page is located at the bottom of the left-hand course navigation menu.

Part (e): Course Videos

Where are the module videos located? Have you been able to watch them?

Solution

The module videos are located at the bottom of each individual week web page. So far, I've been able to watch all the videos.

End of Problem 3

Problem 4: Formative Assessments

In this problem, we'll define the concept of a formative assessment, and confirm the grading session deadlines for Problem Set 0.

First, read the article "CSCI E-5a Spring 2022 Assessments" in the Course Documentation folder, and review the "CSCI E-5a Spring 2022 Grading Schedule Cheatsheet.pdf" document.

Part (a): Explanation

What is a formative assessment? Write your answer using a complete sentence.

Solution

A *formative assessment* is an assignment where we have the opportunity to solve challenging problems with feedback from the teaching staff in a low-stakes environment.

Part (b): Problem Set 0, First Grading Session

When does the gate close for the first grading session for Problem Set 0? Write your answer using a complete sentence, and explicitly specify the day, date, and time (use EDT).

Solution

The gate for the first grading session for Problem Set 0 closes on Monday, January 24, at 11 PM EDT.

Part (c): Problem Set 0, Second Grading Session

When does the gate close for the second grading session for Problem Set 0? Write your answer using a complete sentence, and explicitly specify the day, date, and time (use EDT).

Solution

The gate for the second grading session for Problem Set 0 closes on Monday, January 31, at 11 PM EDT.

Part (d): Problem Set 0, Third Grading Session

When does the gate close for the third grading session for Problem Set 0? Write your answer using a complete sentence, and explicitly specify the day, date, and time (use EDT).

Solution

The gate for the third grading session for Problem Set 0 closes on Monday, February 7, at 11 PM EDT.

End of Problem 4

Problem 5: Summative Assessments

In this problem, we'll define the concept of a summative assessment, confirm the dates of the summative assessments, and discuss high-stakes testing.

First, read the article "CSCI E-5a Spring 2022 Assessments" in the Course Documentation folder, and review the "CSCI E-5a Spring 2022 Grading Schedule Cheatsheet.pdf" document.

Part (a): Explanation

What is a summative assessment? Write your answer using a complete sentence.

Solution

A *summative assessment* is an assignment where the teaching staff rigorously and objectively evaluates the knowledge and skills that you have developed in the course.

Part (b): Midterm Assessment

When will the Midterm Assessment be released, and when is it due? Write your answer using a complete sentence, and explicitly specify the days, dates, and times (use EDT).

Solution

The Midterm Assessment will be released on Monday, March 7, at 5 PM EDT. The only gate for the Midterm Assessment closes on Monday, March 14, at 11 PM EDT.

Part (c): Comprehensive Assessment

When will the Comprehensive Assessment be released, and when is it due? Write your answer using a complete sentence, and explicitly specify the days, dates, and times (use EDT).

Solution

The Comprehensive Assessment will be released on Monday, May 2, at 5 PM EDT. The gate for the Comprehensive Assessment will close on Monday, May 9, at 11 PM EDT.

Part (d): High-Stakes Testing

Your final grade in this course depends heavily on your performance on the two summative assessments. In practice, students who do the readings and problem sets tend to do well on these assessments, and people generally agree that they are fair. On the other hand, you should be aware that the examinations are demanding and require a considerable investment of time, and your scores on these two assessments will comprise at least 80% of your final grade. Thus, CSCI E-5a is structured around high-stakes testing, and you must feel comfortable with this regimen in order to take the course. I believe that this approach is actually in your interest, as it's easier to focus on just a few challenges rather than be spread over a lot of challenges. Also, by limiting the number of summative assessments we can actually spend more time on formative assessments, so you get more hands-on practice this way. However, I do understand that this method is not for everyone and may be unacceptably high-pressure for some people, so I want to be clear with you about what the course entails before you commit.

Write a single sentence acknowledging that the course relies heavily on the two summative assessments, and that you accept this high-stakes testing approach.

Solution

I understand that CSCI E-5a relies heavily on high-stakes summative assessments for determining the final course letter grade, and I accept this approach.

End of Problem 5

Problem 6: R Markdown

In this problem, we'll practice various R markdown techniques.

Part (a): Bold

Write the sentence "To be or not to be – that is the question" in regular text, and then use R markdown to put the word "question" in boldface.

Solution

To be or not to be – that is the **question**.

Part (b): Italics

Write the sentence "To be or not to be – that is the question" in regular text, and then use R markdown to put the word "question" in italics.

Solution

To be or not to be – that is the *question*.

Part (c): Verbatim

Write the sentence "To be or not to be – that is the question" in regular text, and then use R markdown to put the word "question" in verbatim.

Solution

To be or not to be, that is the `question`.'

Part (d): Block quote

Write the sentence "To be or not to be – that is the question" displayed as a block quote.

Solution

> To be or not to be, that is the question.

Part (e): LaTeX

Consider this mathematical expression:

$$\int_{-\infty}^{+\infty} \exp\left\{-\frac{x^2}{2}\right\} \cdot dx \;=\; \sqrt{2\pi}$$

What sort of typesetting is this, and what should you do when you encounter it?

Solution

This is an example of LaTeX typesetting. I should leave it alone when I encounter it.

Part (f): Pandoc

Sometimes the pandoc system can fail to knit an R notebook successfully, even though the notebook does not contain any errors. What should you do if this happens?

Solution

If pandoc is not working, try closing RStudio,reopening it, and trying to knit again.

End of Problem 6

Problem 7: Code Chunks

In this problem, we'll define the concept of code chunks, and also run them.

First, read Module 4, Section 4 on Code Chunks.

Part (a): R and RStudio

What is R? Write your answer using a complete sentence.

Solution

R is a computational engine that takes symbolic expressions as input, evaluates them, and returns the output value.

Part (b): RStudio

Explain what RStudio is, and how it relates to R. Write your answer using a complete sentence.

Solution

RStudio is a user interface for working with R.

Part (c): Code chunks

Explain how code chunks work.

Solution

The start and end of a code chunk are indicated by three backtick marks. RStudio sends all the text contained by these delimiters directly to R for evaluation, and displays any output return values.

Part (d): 2 + 2

What is 2 + 2? To solve this mystery, type the expression "2 + 2" into the code chunk below and then run it. Don't include the quotes!

Solution

Part (e): 5 times 7

What is 5 times 7? To solve this mystery, create a code chunk and then type in the expression "5 * 7". (Again, don't include the quotes.)

Solution

```
5 * 7
```

```
## [1] 35
```

End of Problem 7

Problem 8: Gradescope

In this problem, we'll upload our finished Problem Set 0 PDF to Gradescope.

Knit this R notebook to a PDF document. Then log into the course website, and navigate to Gradescope. Submit your assignment to "Problem Set 0: Course Orientation (First Grading Session)", and be sure to associate pages with problems.

There's nothing to report here, and as long as you submit your assignment properly and associate pages with problems (including this one!) we'll automatically give you full credit for this problem.