Math 250 midterm 1 AU 2024

This is a an open-resource exam. You are free to work together and to use resources such as books, videos, and the internet. However, you may **not** directly request answers from people outside the class, including in online forums like StackOverflow. I monitor several such sites and will report violations of this policy to the academic honesty committee.

All work should be done according to the best practices established in class. Functional code isn't enough! Your work will also be graded for clarity and style.

Use of AI tools like ChatGPT is discouraged for the following reasons:

1) code generated by such tools often does not meet the standards used in class and so may receive poor marks.
2) you are responsible for any plagiarism or other malfeasance you turn in, even/especially if it's generated by AI.
3) you should be able to replicate and explain any code that you submit. Do **not** turn in any work that you do not understand.

The following problems make use of the `bechdel` data set, included in the `fivethirtyeight` package. Submit a single neat .html file to Moodle by Friday, Sept. 26, at 9:00 am.

Problem 1

What is "The Rule" and how did it originate? What is the source of the `bechdel` data set and how does it relate to The Rule? Your answer should be a paragraph long and must include at least once source citation as a footnote. Do your best to make this paragraph informative and interesting.

Problem 2

Obtain a new data set, `bechdel_sm`, that includes only includes movies made since 2000 (inclusive) and the variables `title`, `year`, `clean_test`, `binary`, `budget_2013`, `domgross_2013`, and `intgross_2013`. Glimpse your result.

In every problem that follows, start with `bechdel_sm` rather than `bechdel`.

Problem 3

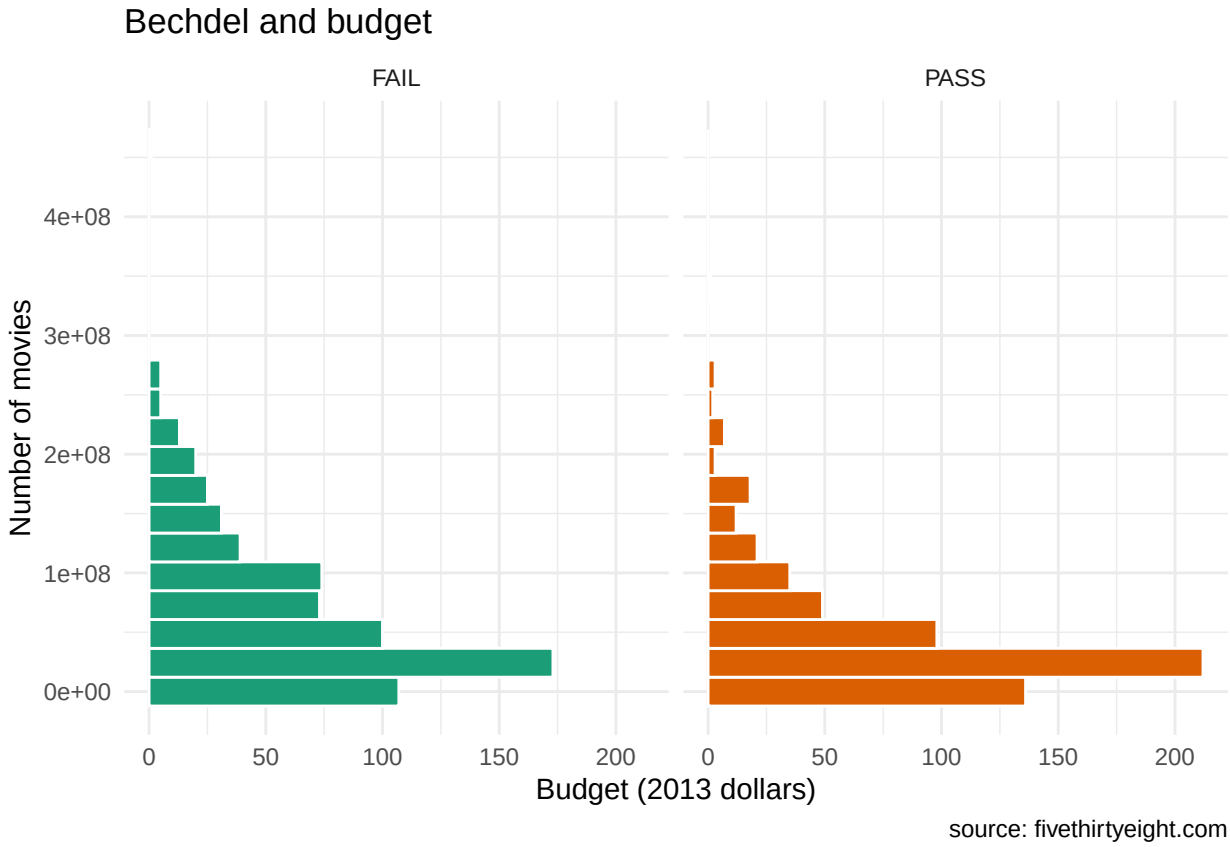
Add a new column to `bechdel_sm` showing the profit made by each movie in 2013 dollars, taking into account both domestic and international revenue. Give this column a logical name. Remove any rows for which your new profit variable is missing, then shift all movies that failed the Bechdel test to the bottom of the data frame. Glimpse your result

Problem 4

What fraction of movies in `bechdel_sm` pass the Bechdel test? Of those that pass, what fraction had a budget (in 2013 dollars) greater than the median budget of all movies in `bechdel_sm`? Write a sentence or two stating your answer explicitly so that the reader doesn't have to code-dive to find it (still include the code that generates your answer, though).

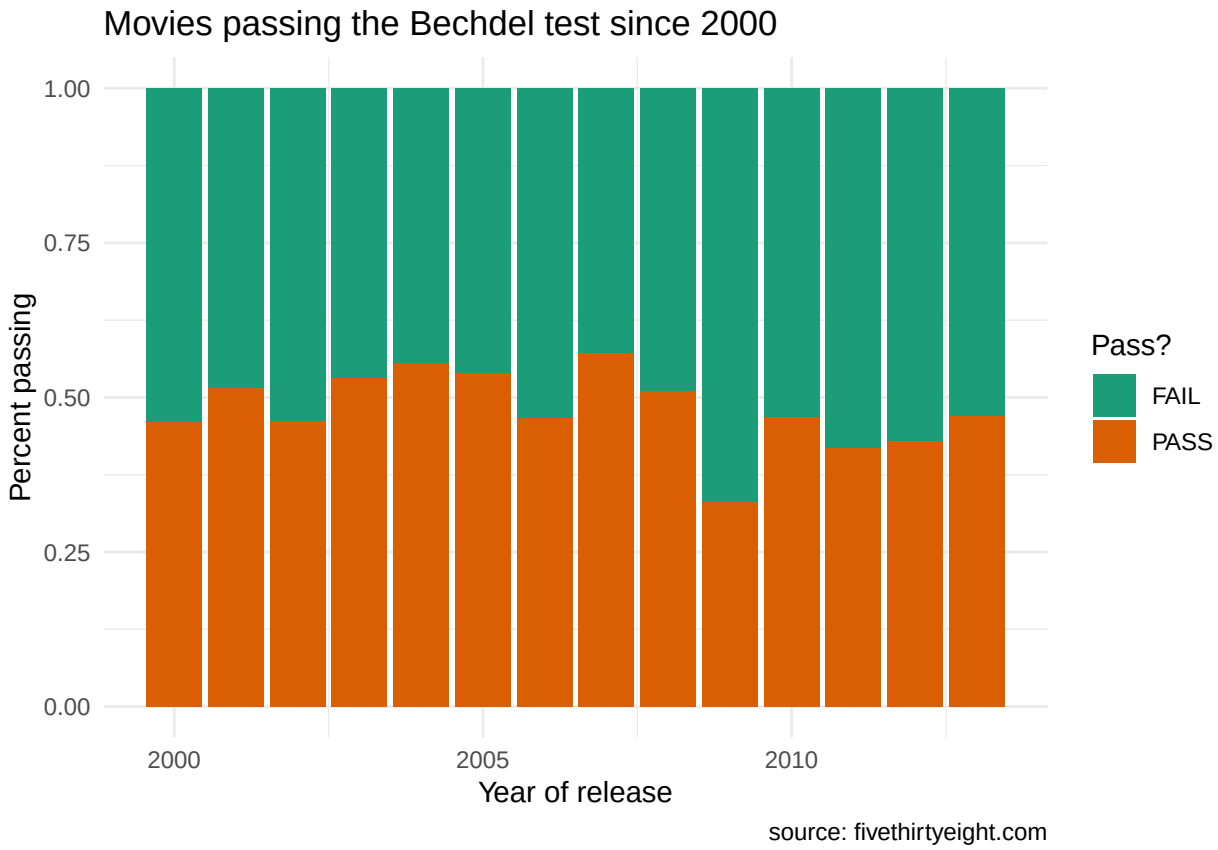
Problem 5

Give code to recreate the following plot as closely as possible.



Problem 6

Give code to recreate the following plot as closely as possible.


Movies passing the Bechdel test since 2000
1.00
0.75
0.50
0.25
0.00
Percent passing
2000
2005
2010
Year of release
Pass?
FAIL
PASS
source: fivethirtyeight.com