ICS 6B F23 Take Home Exam 8

Due: November 24th, 2023 at 11:59PM

Name: _____

UCI NetID : | | | | | | | | |

(**alpha-numeric; NOT your student ID**)

- **Read** the instructions of each question carefully.
- **All problems will have a "What to show" section that will describe exactly what work is expected of you we solving the problem. Failure to meet the requirements of the "What to show" sections will result in a Not Yet. If you have questions about what to show please ask on Ed.**
- An answer where thought process is unclear will be given a grade of Not Yet
- Your submission should follow the template exactly. Any insertion, removal, or reordering of pages from the original template may result in readers not grading certain problems. In such an event you will receive "Not Yet" and no feedback on the problems in question.
- Place your answers in the boxed regions. Writing outside of the boxes will not be considered as part of your answers.
- This exam will cover the Outcomes from the A Learning Objective
- Please keep in mind of the academic honesty guidelines. This take-home exam is to be **completed individually, with no outside help**. You may use any resources from our class (ZyBooks and resources from Canvas), but you may not use any other online resources.
- You may choose to print the exam or use a digital editor for completing the exam. It is required that you use this PDF to complete your work. If you have no access to a printer or digital tools to fulfill the exam, feel free to reach out to the staffs regarding your concern.
- If you have any questions, please post a private Ed or attend available Office Hours. Note that we are not allowed to provide specific help to answering the exam questions.

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Problem 3 (A3)

For each relation, indicate whether the relation is a partial order, a strict order, or neither. If the relation is a partial or strict order, indicate whether the relation is also a total order. Justify your answers.
a) The domain for the relation is $Z \times Z$. (a, b) is related to (c, d) if $(a - c) < (b - d)$.
b) $S = \{a, b, c, d\}$. The domain is $P(S)$, the power set of S. For X, Y that are subsets of S, X is related to Y if $|X| = |Y| + 1$.
c) $A = \{1, 2, 3, 4\}$. The domain is $P(A)$, the power set of A. For $X \in P(A)$ and $Y \in P(A)$, X is related to Y if X is a subset of Y.
What you need to show: Select all that applied for each part. Justify your answer by explaining whether the related properties are satisfied or not. For example, if you think the relation is a partial order, you need to show it is reflexive, transitive and anti-symmetric; show each property using one or two sentences. If you think it's not a partial order, you just need to show one of the properties is violated. You can also refer to exercise 6.8.1 in zybook for more information about the answer we expect.

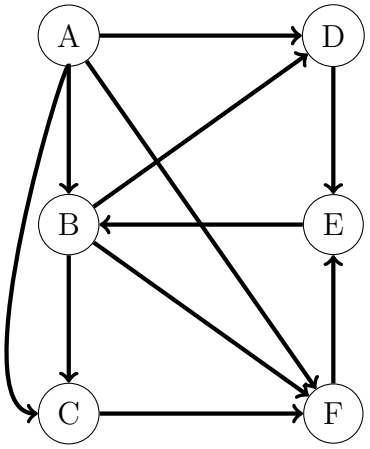
Problem 4 (A4)

The domain of relation R is the set $\{A, B, C, D, E, F\}$. R is a strict order defined as:

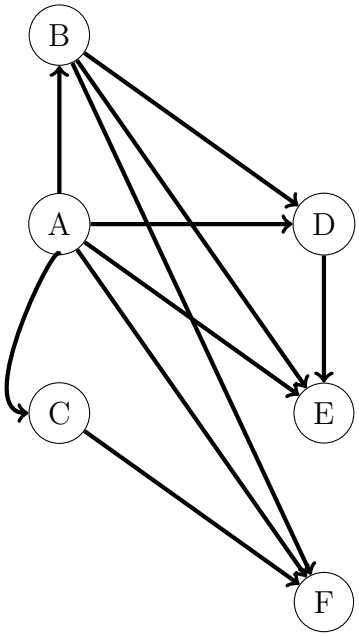
$$\{(B, F), (C, F), (A, F), (A, E), (B, C), (A, B), (A, C), (A, D), (B, D), (B, E), (D, E)\}.$$

Select the right directed acyclic graph that describes it and identify valid topological sorts.
a) Graphs:

Graph 1:



Graph 2:



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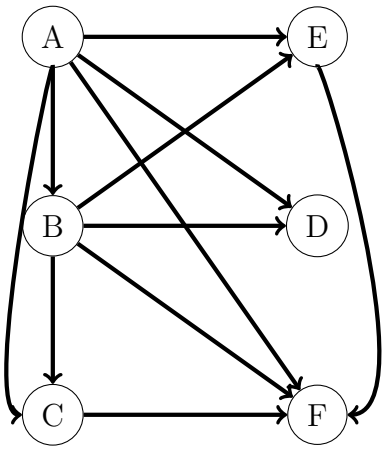
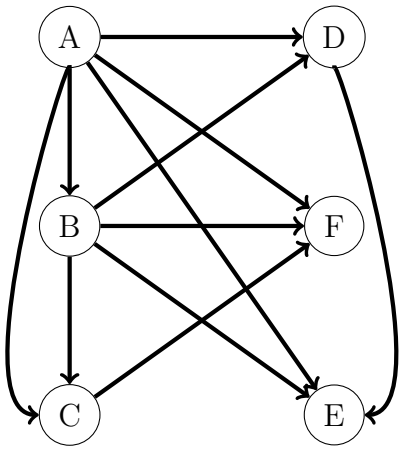
Graph 3:



Graph 4:



b) Sorts:
Sort 1: (A, C, B, D, F, E)
Sort 2: (A, B, C, D, E, F)
Sort 3: (A, C, B, E, D, F)
Sort 4: (A, B, D, C, F, E)
What you need to show: Select all that applied. No need to explain.