Group Work, CSC-161
Closure

For each of the problems below, first decide whether the criterion makes sense. (Remember for a set to be closed under **blah**, it has to make sense to do **blah** to the *elements* of the set.) For those criteria that do make sense, either find an example, or state that no such example exists. We are particularly interested to understand the properties of the set of regular languages, so keep this example in mind at all times. Restrict yourself to languages over $\{a.b\}$.

1. A regular language.
2. A language that is not regular.
3. A finite language.
4. An infinite language.
5. A language that is closed under reversal.
6. A language that is not closed under reversal.
7. A language that is closed under concatenation.
8. A language that is not closed under concatenation.
9. A language that is closed under union.
10. A language that is not closed under union.
11. A finite set of languages.
12. An infinite set of languages.
13. A set of languages that is closed under reversal.
14. A set of languages that is not closed under reversal.
15. A set of languages that is closed under transpose.
16. A set of languages that is not closed under transpose.
17. A set of languages that is closed under union.
18. A set of languages that is not closed under union.
19. A set of languages that is closed under intersection.
20. A set of languages that is not closed under intersection.
21. A set of languages that is closed under complement.
22. A set of languages that is not closed under complement.

23. A set of languages that is closed under concatenation.
24. A set of languages that is not closed under concatenation.
25. A set of languages that is closed under star closure.
26. A set of languages that is not closed star closure.