

COMMENTS:

- MQ_stable_matching_unique
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keywords = [*stable_matching stable_marriage invariant mating_ritual optimal pessimal*]

Problem 1.

Consider a stable marriage problem with 4 boys and 4 girls. Here are their preference rankings:

| | |
|---------|------------------------------|
| Alfred: | Grace, Helen, Emily, Fiona |
| Billy: | Emily, Grace, Fiona, Helen |
| Calvin: | Helen, Emily, Fiona, Grace |
| David: | Helen, Grace, Emily, Fiona |
| Emily: | Calvin, Alfred, David, Billy |
| Fiona: | Alfred, Billy, Calvin, David |
| Grace: | Alfred, Calvin, David, Billy |
| Helen: | Alfred, Billy, David, Calvin |

- (a) Exhibit a stable matching between the boys and girls.
- (b) Explain why this is the only stable matching possible.
- (c) Suppose that Harry is one of the boys and Alice is one of the girls when a Mating Ritual is performed. Circle the properties below that must be preserved invariants.
- (i) Harry is serenading Alice.
 - (ii) Alice is crossed off Harry's list.
 - (iii) Alice likes her favorite better than Harry.
 - (iv) Alice has at least one suitor.
 - (v) Harry is serenading a girl he likes better than Alice.
 - (vi) Harry is serenading a girl he likes less than Alice.