This miniproject asks you to find specific examples of relations, illustrated with digraphs, of relations with certain properties. You will need the definition of irreflexive and asymmetric given just prior to exercises 9 and 16 in Section 8.1.

Consider the six properties reflexive, symmetric, antisymmetric, transitive, irreflexive, and asymmetric. Draw a digraph with at least four vertices that illustrates a relation with the following property(s), if possible. If not possible, say why it isn't.

(i) The relation has none of these six properties.

(ii) The relation has only the reflexive property of these six.

(iii) The relation has only the symmetric property.

(iv) The relation has only the antisymmetric property.

(v) The relation has only the transitive property.

(vi) The relation has only the irreflexive property.

(vii) The relation has only the asymmetric property.

(viii) The relation has the reflexive and symmetric properties only.

(ix) The relation has the reflexive and antisymmetric properties only.

(x) The relation has the reflexive and transitive properties only.

(xi) The relation has the reflexive and irreflexive properties only.

(xii) The relation has the reflexive and asymmetric properties only.

(xiii) The relation has the symmetric and antisymmetric properties only.

(xiv) The relation has the symmetric and transitive properties only.

(xv) The relation has the symmetric and irreflexive properties only.

(xvi) The relation has the symmetric and asymmetric properties only.

(xvii) The relation has the antisymmetric and transitive properties only.

(xviii) The relation has the antisymmetric and irreflexive properties only.

(xix) The relation has the antisymmetric and asymmetric properties only.

(xx) The relation has the transitive and irreflexive properties only.

(xxi) The relation has the transitive and asymmetric properties only.

(xxii) The relation has the irreflexive and asymmetric properties only.

(xxiii) The relation has the reflexive, symmetric, and antisymmetric properties only.

(xxiv) The relation has the reflexive, symmetric, and transitive properties only.

(xxv) The relation has the reflexive, symmetric, and irreflexive properties only.

(xxvi) The relation has the reflexive, symmetric, and asymmetric properties only.

(xxvii) The relation has the reflexive, antisymmetric, and transitive properties only.

(xxviii) The relation has the reflexive, antisymmetric, and irreflexive properties only.

(xxix) The relation has the reflexive, antisymmetric, and asymmetric properties only.

(xxx) The relation has the reflexive, transitive, and irreflexive properties only.

(xxxi) The relation has the reflexive, transitive, asymmetric properties only.

(xxxii) The relation has the reflexive, irreflexive, and asymmetric properties only.

(xxxiii) The relation has the symmetric, antisymmetric, and transitive properties only.

(xxxiv) The relation has the symmetric, antisymmetric, and irreflexive properties only.

(xxxv) The relation has the symmetric, antisymmetric, and asymmetric properties only.

(xxxvi) The relation has the symmetric, transitive, and irreflexive properties only.

(xxxvii) The relation has the symmetric, transitive, and asymmetric properties only.

(xxxviii) The relation has the symmetric, irreflexive, and asymmetric properties only.

(xxxix) The relation has the antisymmetric, transitive, and irreflexive properties only.

(xl) The relation has the antisymmetric, transitive, and asymmetric properties only.

(xli) The relation has the antisymmetric, irreflexive, and asymmetric properties only.

(xlii) The relation has the transitive, irreflexive, and asymmetric properties only.

(xliii) The relation has the reflexive, symmetric, antisymmetric, and transitive properties only.

(xliv) The relation has the reflexive, symmetric, antisymmetric, and irreflexive properties only.

(xlv) The relation has the reflexive, symmetric, antisymmetric, and asymmetric properties only.

(xlvi) The relation has the reflexive, symmetric, transitive, and irreflexive properties only.

(xlvii) The relation has the reflexive, symmetric, transitive, and asymmetric properties only.

(xlviii) The relation has the reflexive, symmetric, irreflexive, and asymmetric properties only.

(xlix) The relation has the reflexive, antisymmetric, transitive, and irreflexive properties only.

(l) The relation has the reflexive, antisymmetric, transitive, and asymmetric properties only.

(li) The relation has the reflexive, antisymmetric, irreflexive, and asymmetric properties only.

(lii) The relation has the reflexive, transitive, irreflexive, and asymmetric properties only.

(liii) The relation has the symmetric, antisymmetric, transitive, and irreflexive properties only.

(liv) The relation has the symmetric, antisymmetric, transitive, and asymmetric properties only.

(lv) The relation has the symmetric, antisymmetric, irreflexive, and asymmetric properties only.

(lvi) The relation has the symmetric, transitive, irreflexive, and asymmetric properties only.

(lvii) The relation has the antisymmetric, transitive, irreflexive, and asymmetric properties only.

(lviii) The relation has the reflexive, symmetric, antisymmetric, transitive, and irreflexive properties only.

(lix) The relation has the reflexive, symmetric, antisymmetric, transitive, and asymmetric properties only.

(lx) The relation has the reflexive, symmetric, antisymmetric, irreflexive and asymmetric properties only.

(lxi) The relation has the reflexive, symmetric, transitive, irreflexive, and asymmetric properties only.

(lxii) The relation has the reflexive, antisymmetric, transitive, irreflexive, and asymmetric properties only.

(lxiii) The relation has the symmetric, antisymmetric, transitive, irreflexive, and asymmetric properties only.

(lxiv) The relation has all six properties.