========= Problem 1 =========

-- A --

G1:

a-b-e-d-c-e-a

G2:

The path does not have a Euler circuit. Vertices with odd degrees: a, b, c, d

G3:

The path does not have a Euler circuit. Vertices with odd degrees: a, b

Bridge of Koingsberg:

The path does not have a Euler circuit. Vertices with odd degrees: a, d

-- B --

Test Graph:

a-b-c-f-e-b-d-g-h-i-f-h-e-d-a

========= Problem 2 =========

-- A --

G1:

Degree of d is less than n/2 (2.5). There MIGHT still be a Hamilton circuit.

G2:

Degree of a is less than n/2 (2.0). There MIGHT still be a Hamilton circuit.

G3:

Degree of a is less than n/2 (3.5). There MIGHT still be a Hamilton circuit.

-- B --

Test Graph:

Degree of a is less than n/2 (3.0). There MIGHT still be a Hamilton circuit.

========= Problem 3 =========

-- A --

G1:

The graph must have a Hamilton circuit according to Ore's theorem.

G2:

The graph might still be a Hamilton circuit (Ore's condition failed for vertices a and c).

G3:

The graph might still be a Hamilton circuit (Ore's condition failed for vertices a and c).

-- B --

Test Graph:

The graph might still be a Hamilton circuit (Ore's condition failed for vertices a and d).

========= Problem 4 =========

-- A --

Debugging Game with Initial State [2, 2, 1]:

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

-- B --

Testing Game with Initial State [1, 2, 3]:

Player A: [3, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

-- C --

Game 1:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 2:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 3:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 4:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 5:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 6:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 7:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 8:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 9:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 10:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 11:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 12:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 13:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 14:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 15:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 16:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 17:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 18:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 19:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 20:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 21:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 22:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 23:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 24:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 25:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 26:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 27:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 28:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 29:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 30:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 31:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 32:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 33:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 34:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 35:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 36:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 37:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 38:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 39:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 40:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 41:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 42:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 43:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 44:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 45:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 46:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 47:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 48:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 49:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 50:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 51:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 52:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 53:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 54:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 55:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 56:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 57:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 58:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [1, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 59:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 60:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 61:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 62:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 63:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 64:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 65:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 66:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 67:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 68:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 69:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 70:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 71:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 72:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 73:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 74:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 75:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 76:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 77:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 78:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 79:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 80:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 81:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 82:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [2, 0, 0]

Player A: [0, 0, 0]

Player A wins

Game 83:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 84:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 85:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 86:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [1, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 87:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 88:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 89:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 90:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 91:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 92:

Start: 2 2 1

Player B: [0, 2, 1]

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 93:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 94:

Start: 2 2 1

Player B: [2, 1, 1]

Player A: [1, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 95:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 96:

Start: 2 2 1

Player B: [1, 2, 1]

Player A: [2, 2, 0]

Player B: [0, 2, 0]

Player A: [2, 1, 0]

Player B: [0, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 97:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 98:

Start: 2 2 1

Player B: [2, 0, 1]

Player A: [2, 2, 0]

Player B: [2, 0, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 99:

Start: 2 2 1

Player A: [2, 2, 0]

Player B: [2, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Game 100:

Start: 2 2 1

Player B: [2, 2, 0]

Player A: [2, 1, 0]

Player B: [1, 1, 0]

Player A: [1, 0, 0]

Player B: [0, 0, 0]

Player B wins

Player A wins: 22

Player B wins: 78