Exam 4

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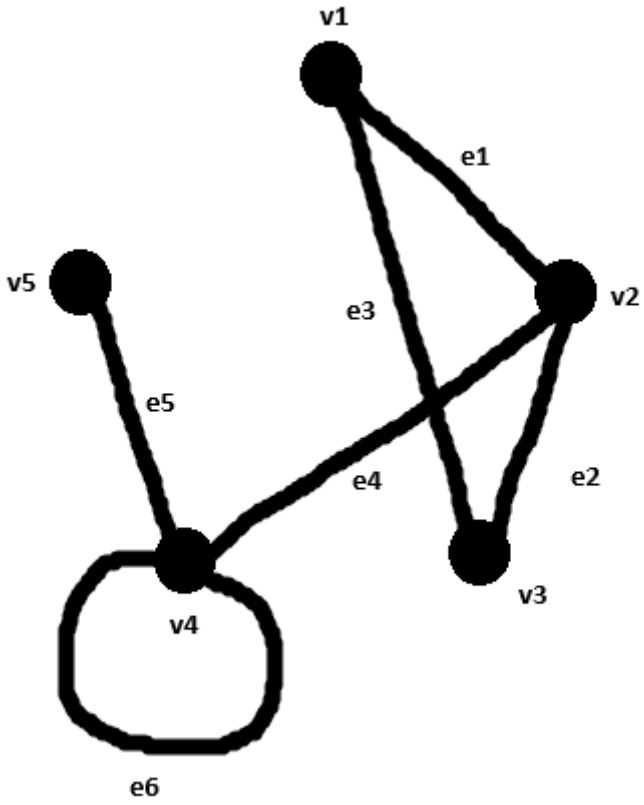
1

a)

v1 → v2 → v3 → v1, also v4 → v4

b)



c)

v1: in 1 out 1, v2: in 1 out 2, v3: in 1 out 1, v4: in 2 out 2, v5: in 1 out 0

d)

V = {v1, v3, v4, v5}, E = {e3 = (v3, v1), e5 = (v4, v5), e6 = (v4,v4)}

e)

yes, {v1,v3} and {v4,v5}

2

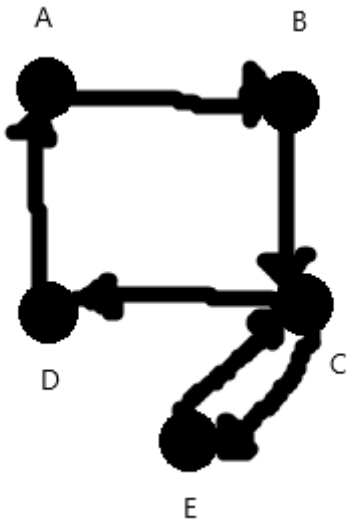
A multigraph allows multiple edges between any pair of vertices, simple graph do not.

Example: V = {a,b,c}, E = {(a,b), (b,a), (b,c), (c,a), (a,a)}

Realworld example: A highway system

3

a)



b)

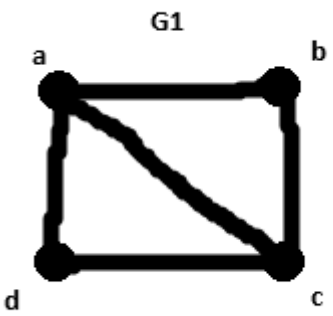
A → B → C → D → A, also C → E → C.

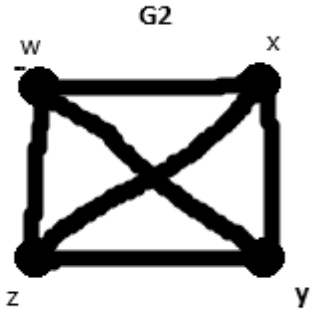
c)

Yes, A → B → C → E → C → D → A

4

a)





b)

i.

f(a) = w

f(b) = x

f(c) = y

f(d) = z

ii.

h(a,b) = (w,x)

h(b,c) = (x,y)

h(c,d) = (y,z)

h(d,a) = (z,w)

h(a,c) = (w,y)

iii.

No, G2 has edge (x,z), which G1 has no corresponding edge for. G1 and G2 are not isomorphic with each other.

5

a) No G1 has a cycle, G2 does not

b)

011000

101001

110110

001000

001000

010000

c)

011100

101011

110111

101010

011101

011010

d)

g1(1) = 2, g1(2) = 3, g1(3) = 5, g1(4) = 1, g1(5) = 1, g1(6) = 2,

g2(A) = 2, g2(B) = 2, g2(C) = 5, g2(D) = 1, g2(E) = 3, g2(F) = 1,