Assignment 3:

Q1:

(1): the uncovered set {a, b, c}

The uncovered set is a subset of the top cycle.

(2): the top cycle {a, b, c, d, e, f}

Find a cycle {a, b, c}, a cannot beat e  
expand the cycle to {a, b, c, d, e, f}, every points in this cycle beats every points outside the cycle.

(3): the set of Copeland winners CO(T) = {c}

Copeland score of a = 4

Copeland score of b = 4

Copeland score of c = 5

Copeland score of d = 3

Copeland score of e = 3

Copeland score of f = 2

Copeland score of g = 0

(4): the set of Banks winners {c}

(5): the set of Condorcet winners {c}

The reason: a dominate b, d, g and f   
b dominate c, d, e and g  
c dominate a, d, g, ,f and e  
d dominate e, f and g  
e dominate a, f and g  
f dominate b and g  
g dominate nothing.

Q4:

Well, first consider the students

1 pick e, 2 pick b, 3 pick a, 4 pick a, 5 pick d  
then consider school, school a prefers 2, 4, 3, 5, 1, so it pick 4  
then consider student, 1 pick e, 2 pick b, 3 pick b, 4 pick a, 5 pick d  
then consider school, school b prefers 3, 2, 4, 5, 1, so it pick 3  
then consider student, 1 pick e, 2 pick a, 3 pick b, 4 pick a, 5 pick d  
then consider school, school a prefers 2, 4, 3, 5, 1, so it pick 2  
then consider student, 1 pick e, 2 pick a, 3 pick b, 4 pick b  
then consider school, school b prefers 3, 2, 4, 5, 1, so it pick 3  
then consider student, 1 pick e, 2 pick a, 3 pick b, 4 pick c, 5 pick d  
then end.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Agent | 1 | 2 | 3 | 4 | 5 |
| e | b | a | a | d |
| e | b | b | a | d |
| e | a | b | a | d |
| e | a | b | b | d |
| e | a | b | c | d |

It is not the Pareto optimal for the students. For there is an allocation that can be better for students 2 and 3. The allocation is that {1, e}, {2, b}, {3, a}, {4, c}, {5, d}. Students 1, 4 and 5 are the same as before, however, students 2 and 3 are more satisfied than before.

Xuesheng:

Xuexiao : a :2 ,b:3,c:3,d:5,e:1

a :2 ,b:3,c:2,d:5,e:1

a:2, ,b:3, c:4,d:5,e:1

Assignment 3:

Q1:

(1): the uncovered set {a, b, c}

The uncovered set is a subset of the top cycle which can arrive each point within two steps.

(2): the top cycle {a, b, c, d, e, f, g}

There is a cycle {a, b, c, d, f, g, e} where every point can reach other point.

(3): the set of Copeland winners CO(T) = {a, b, c}

The reason:

a dominate b, d, g and f

b dominate c, d, e and g

c dominate a, d, e and f

d dominate e, f and g

e dominate a and f

f dominate b and g

g dominate c and e.

So:

Copeland score of a = 4

Copeland score of b = 4

Copeland score of c = 4

Copeland score of d = 3

Copeland score of e = 2

Copeland score of f = 2

Copeland score of g = 2

(4): the set of Banks winners {a,b,c,e}

(5): the set of Condorcet winners none

The reason: a dominate b, d, g and f

b dominate c, d, e and g

c dominate a, d, e and f

d dominate e, f and g

e dominate a and f

f dominate b and g

g dominate c and e.

There is no Condorcet winner because all point in the graph has at least one parent.

Q4:

Well consider school first

a pick a, b pick 3, c pick 3, d pick 5, e pick 1

then consider student, 3 will choose b

then consider school, a pick2, b pick 3, c then pick 2, d pick 5, e pick 1

then consider student, 2 will choose a

then consider school, a pick 2, b pick 3, c then pick 4, d pick 5, e pick 1

At that time, all school receive only one student.

The final result is {1, e}, {2, a}, {3, b}, {4, c}, {5, d}.

School a b c d e

2 3 3 5 1

2 3 2 5 1

2 3 4 5 1

It is not the Pareto optimal for the students. For there is an allocation that can be better for students 2 and 3. The allocation is that {1, e}, {2, b}, {3, a}, {4, c}, {5, d}. Students 1, 4 and 5 are the same as before, however, students 2 and 3 are more satisfied than before.