Standard (unidirectional) GS algorithm

Total Welfare: 43

Students (proposers)

	5	4	3	2	1
A	L	M	N	O	P
B	O	P	L	N	M
C	P	O	L	M	N
D	L	N	O	M	P
E	M	N	O	P	L

Firms (acceptors)

	5	4	3	2	1
L	A	D	B	E	C
M	C	E	B	D	A
N	A	D	C	B	E
O	C	A	D	B	E
P	B	C	D	A	E

Matching Table

A	L
B	O
C	P
D	N
E	M

sum of preferences of all players
=
43

10
7
9
8
9

Bidirectional GS algorithm (recursive)

Total Welfare: 45

Students (proposers / acceptors)

	5	4	3	2	1
A	L	M	N	O	P
B	O	P	L	N	M
C	P	O	L	M	N
D	L	N	O	M	P
E	M	N	O	P	L

Firms (acceptors / proposers)

	5	4	3	2	1
L	A	D	B	E	C
M	C	E	B	D	A
N	A	D	C	B	E
O	C	A	D	B	E
P	B	C	D	A	E

Matching Table

A	L	sum of preferences for all players = **45**	10
B	P		9
C	O		9
D	N		8
E	M		9

Bidirectional GS algorithm (with steps within time blocks)

Total welfare: 45

Students (proposers / acceptors)

t	1	2	3	4	5
preferences	**5**	**4**	**3**	**2**	**1**
A	L	M	N	O	P
B	O	P	L	N	M
C	P	O	L	M	N
D	L	N	O	M	P
E	M	N	O	P	L

Firms (acceptors / proposers)

t	1	2	3	4	5
preferences	**5**	**4**	**3**	**2**	**1**
L	A	D	B	E	C
M	C	E	B	D	A
N	A	D	C	B	E
O	C	A	D	B	E
P	B	C	D	A	E

Matching Table

A	**L**	**sum of preferences of all players = 45**	10
B	**P**		9
C	**O**		9
D	**N**		8
E	**M**		9

Bidirectional GS algorithm (weighted preferences, option 1)

Total Welfare: 47.2826

Students (proposers / acceptors)

t	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
p	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	sum of p	
A	L					M				N	O	P				40	
B				O			P	L				N		M		35	
C	P			O					L	M				N		42	
D	L								N	O		M			P	33	total
E			M	N					O	P			L			41	**191**

Firms (acceptors / proposers)

t	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
p	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	sum of p	
L	A						D		B	E		C				41	
M	C					E				B		D	A			38	
N			A					D	C		B		E			36	
O				C						A	D	B			E	28	total
P	B					C				D				A	E	34	**177**

Matching Table

A	L	**sum of preferences of all players = <u>116</u>**	30
B	P		24
C	O		24
D	N		15
E	M		23

Explanation

The comparison to standard bidirectional GS algorithm is a bit more complex.
First, we have to sum up the preferences at which a candidate is marked for both tables. Then we have to set this number in relation to the added up preferences of standard bidir. GS algorithm:

(191 + 177) / 150 = 2.453333 (division factor) # 150 results from 2 x 5 x (5+4+3+2+1)

116 / 2.453333 = 47.2826 → Improvement compared to standard bidirectional GS algorithm just for this case. Sequence of preference order remains the same.

Bidirectional GS algorithm (weighted preferences, option 2)

Total Welfare: 47.2826

→ the same outcome as in option 1,i.e. the welfare situation is the same.

Students (proposers / acceptors)

t	1			2			3			4			5		
p	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
A	L					M				N	O	P			
B				O			P	L				N		M	
C	P			O					L	M				N	
D	L								N	O		M			P
E			M	N					O	P			L		

Firms (acceptors / proposers)

t	1			2			3			4			5		
p	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
L	A						D		B	E		C			
M	C					E				B		D	A		
N			A					D	C		B		E		
O				C						A	D	B			E
P	B					C				D				A	E

Matching Table

A	L	sum of preferences of all players = **116**	30
B	P		24
C	O		24
D	N		15
E	M		23