The Gale-Shapley Algorithm

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GALE-SHAPLEY()
 1  Initially all m ∈ M and w ∈ W are free
 2  while ∃m who is free and hasn't proposed to every w ∈ W
 3        do Choose such a man m
 4           Let w be the highest ranked in m's preference list
               to whom m has not yet proposed
 5           if w is free
 6              then (m, w) become engaged
 7              else w is currently engaged to m'
 8                   if w prefers m' to m
 9                      then m remains free
10                      else w prefers m to m'
11                           (m, w) become engaged
12                           m' becomes free
13  return the set S of engaged pairs
```

Understanding the Solution

For a given problem instance, there may be several stable matchings. Do all executions of Gale-Shapley yield the same stable matching? If so, which one?

An instance with two stable matchings:
A-X, B-Y, C-Z
A-Y, B-X, C-Z

	1st	2nd	3rd
Xavier	A	B	C
Yancey	B	A	C
Zeus	A	B	C

	1st	2nd	3rd
Amy	Y	X	Z
Bertha	X	Y	Z
Clare	X	Y	Z