

Tests

- tests unitaires
 - `assert`
 - `unittest`
 - `pytest` : plus simple que `unittest`
 - `doctest` : intégration des tests au niveau des commentaires (*peu pratiqué*)
 - tests d'intégration
 - tests end-to-end : tests finaux
 - jouer avec plusieurs scénarios
 - comparaison des résultats
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- nom des fonctions des tests : peu être longues
- **bug** : fonctions explicites pour mettre en évidence le bug

Tie breaker

[Source](#)

[Source_mini](#)

1. Head-to-head

1. List all candidates who are in tie against each other
2. Calculate number of wins against each other (*Condorcet simple*)
3. Sort by wins in reverse order

2. Head-to-head differential

1. List all candidates who are in tie against each other
2. Calculate number of wins & losses against each other (*Condorcet copeland*)
3. Sort by wins in reverse order (*highest positive?*)

3. Head-to-head points against

1. List all candidates who are in tie against each other
2. Calculate number of points against for each candidate
 - (a b) : 3
 - (b a) : 2
 - a : 2 points against
 - b : 3 points against
3. Sort candidates from in normal order (from smallest to biggest)

4. Common opponents

For condorcet only