

3 (4 points). Acme University Computer Science department conducts a faculty vote in order to determine the best choice for the language used in Basic Programming. Each faculty member ranks each programming language in order of preference. The results are shown in the preference schedule below.

Language	Ballots with Rankings				
C	3	2	2	1	4
Guile	1	3	4	3	2
Java	2	4	1	2	3
Python	4	1	3	4	1
Number of Votes	8	5	4	6	2

- (a) Using the plurality voting, which language is the winner of the department vote?
- (b) Is the plurality winner also a majority winner?
- (c) Use the Borda count method to determine the winner. Show all work.

4 (4 points). Use the Pairwise Comparison (a.k.a Copland's method) to determine the winner. Show the result of every head-to-head.

Language	Ballots with Rankings				
C	3	2	2	1	4
Guile	1	3	4	3	2
Java	2	4	1	2	3
Python	4	1	3	4	1
Number of Votes	8	5	4	6	2

5 (4 points). Find the winner using the Plurality With Elimination (a.k.a. Instant Runoff Voting). Show the re-ranked preference schedule after each elimination.

Language	Ballots with Rankings				
C	3	2	2	1	4
Guile	1	3	4	3	2
Java	2	4	1	2	3
Python	4	1	3	4	1
Number of Votes	8	5	4	6	2

6 (4 points). A sample of 200 grocery store patrons were asked to rate some of the popular apple varieties.

Apple	Ballots with Rankings					
Gala	1	2	4	2	5	4
Macoun	2	5	5	1	2	3
Pink Lady	3	3	1	4	4	2
Fuji	4	1	2	5	3	1
Honey Crisp	5	4	3	3	1	5
Number of Votes	42	11	33	28	49	37

(a) Using the plurality voting, which type of apple is the winner?

(b) Use the Borda count method to determine the winner. Show all work.

7 (4 points). Use the Pairwise Comparison (a.k.a Copland's method) to determine the winner. Show the result of every head-to-head.

Apple	Ballots with Rankings					
Gala	1	2	4	2	5	4
Macoun	2	5	5	1	2	3
Pink Lady	3	3	1	4	4	2
Fuji	4	1	2	5	3	1
Honey Crisp	5	4	3	3	1	5
Number of Votes	42	11	33	28	49	37

8 (4 points). Find the winner using the Plurality With Elimination (a.k.a. Instant Runoff Voting). Show the re-ranked preference schedule after each elimination.

Apple	Ballots with Rankings					
Gala	1	2	4	2	5	4
Macoun	2	5	5	1	2	3
Pink Lady	3	3	1	4	4	2
Fuji	4	1	2	5	3	1
Honey Crisp	5	4	3	3	1	5
Number of Votes	42	11	33	28	49	37

9 (4 points). A large sample of gamers is asked to rank some titles by how much replay value they have, the results are summarised below.

Games	Ballots with Rankings						
	1	2	3	4	5	6	7
Minecraft	1	5	1	6	4	3	4
Dark Souls	2	6	4	1	3	2	3
Fortnite	5	1	2	5	6	5	5
Katamari Damacy	3	3	6	3	1	1	2
Fallout	4	4	3	2	2	6	6
Among Us	6	2	5	4	5	4	1
Number of Votes	441	479	438	450	469	445	472

(a) Using the plurality voting, which game is the winner of the vote?

(b) Is the plurality winner also a majority winner?

(c) Use the Borda count method to determine the winner. Show all work.

10 (4 points). Use the Pairwise Comparison (a.k.a Copland's method) to determine the winner. Show the result of every head-to-head.

Games	Ballots with Rankings						
Minecraft	1	5	1	6	4	3	4
Dark Souls	2	6	4	1	3	2	3
Fortnite	5	1	2	5	6	5	5
Katamari Damacy	3	3	6	3	1	1	2
Fallout	4	4	3	2	2	6	6
Among Us	6	2	5	4	5	4	1
Number of Votes	441	479	438	450	469	445	472

11 (4 points). Find the winner using the Plurality With Elimination (a.k.a. Instant Runoff Voting). Show the re-ranked preference schedule after each elimination.

Games	Ballots with Rankings						
Minecraft	1	5	1	6	4	3	4
Dark Souls	2	6	4	1	3	2	3
Fortnite	5	1	2	5	6	5	5
Katamari Damacy	3	3	6	3	1	1	2
Fallout	4	4	3	2	2	6	6
Among Us	6	2	5	4	5	4	1
Number of Votes	441	479	438	450	469	445	472

