

Application Exercise: Superheroes¹

Aliens have invaded Earth and you need to assemble a team of superheroes to protect everyone. Unfortunately, there is a conflict across the galaxy, so some superheroes will need to be assigned to that mission instead. You are put in charge of choosing which superheroes to recruit for your mission, as well as which cities to base your headquarters in.

1. Let's say your headquarters need to be in either New York, Washington D.C., or Los Angeles. What is the complement of choosing Los Angeles?
2. You need to choose a captain from following list: Black Panther, Captain Marvel, Iron Man, Thor. List the ordered pairs of choices of city and captain. Hint: There will be 12 items in the sample space. Abbreviating is helpful here.
3. Consider the events E_1 = Choosing New York, E_2 = Choosing Washington D.C., and E_3 = Choosing Los Angeles. Are E_1 , E_2 , and E_3 mutually exclusive events? Why?
4. You are choosing a team of three superheroes. Are the events E_4 = Choosing Black Panther and E_5 = Choosing Thor mutually exclusive? Why?
5. Are the events E_1 and E_4 mutually exclusive? Why?

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