

Introduction

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Mon, Aug 27, 2018

1 Examples

- Finance
- Elections
- Fair Division
- Traveling
- Fair Representation

2 Assignment

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- You expect inflation to average 4%.

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- You expect inflation to average 4%. Answer: \$1940.24

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2 Assignment

Example (Elections)

- There are four candidates, Alan, Bob, Cathy, and Donna, running for the office of president of the Math and Society Club.
- Call them A, B, C, and D.
- There are 37 Math and Society Club members.
- Each member ranks the four candidates in order of preference.

Example (Elections)

	14	11	8	4
1st	A	C	D	B
2nd	B	B	C	D
3rd	C	D	B	C
4th	D	A	A	A

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	14	11	8	4
1st	A	C	D	B
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Who should be the winner?

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	14	11	8	4
1st	A	C	D	B
2nd	B	B	C	D
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4th	D	A	A	A

Most voters want anyone but *A*.

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- What if they range from a cookie to a pie?
- What if the cookies are Oreos and the pie is coconut? (Some people love Oreo cookies; some don't. Some people love coconut pie; some don't.)
- What if they range from a Bic pen to an iPhone?

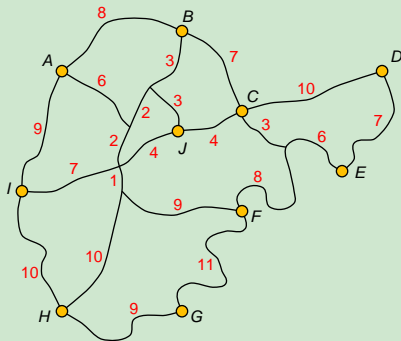
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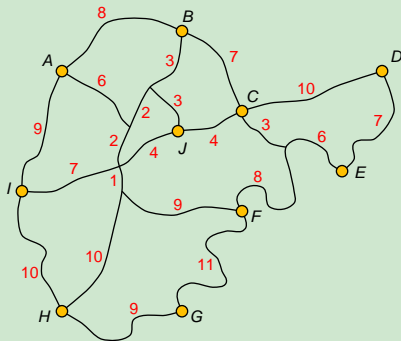
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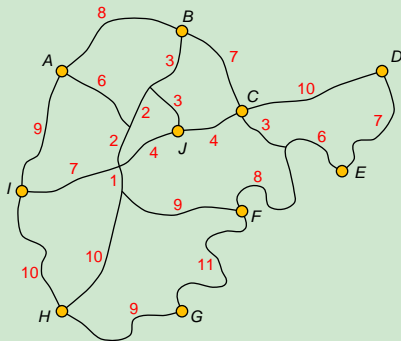
Here is a highway map showing locations *A* through *J*.

Example



What is the shortest route (path) from *A* to *E*?

Example



What if you had to deliver packages to each of the cities?

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- Should each class have 3 representatives? (the Senate)
- What if the freshman class is *much* larger than the senior class, say 600 freshmen, 300 sophomores, 200 juniors, and 100 seniors? (the House of Representatives)
- Suppose that there are 500 freshmen, 200 sophomores, 200 juniors, and 100 seniors.

Example (Fair Representation)

- More realistically, suppose that there are 427 freshmen, 255 sophomores, 297 juniors, and 189 seniors.

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