

Introduction

Robb T. Koether

Hampden-Sydney College

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Examples

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

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Assignment

Outline

1 Examples

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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 Debate Club.
- Call them A, B, C, and D.
- There are 37 Debate Club members.
- Each member ranks the four candidates in order of preference.

Elections

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

Elections

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

Elections

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	14	11	8	4
1st	A	C	D	B
2nd	B	B	C	D
3rd	C	D	B	C
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 coconut and the pie is rhubarb? (Some people love coconut; some hate it. Some people love rhubarb; and some hate it.)
- What if they range from a pencil to an iPhone?

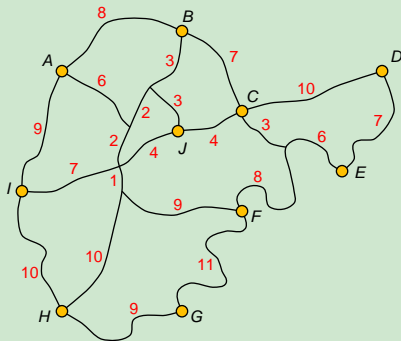
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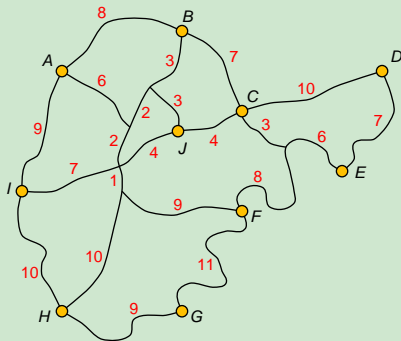
2 Assignment

Example



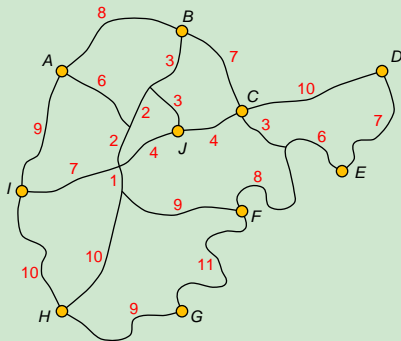
Here is a highway map showing locations *A* through *J*.

Example



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

Example



What is the shortest route (circuit) that visits every location and returns to its starting point?

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Fair Representation

Example (Fair Representation)

Suppose that the student government has 12 representatives to represent the four classes (freshman, sophomore, junior, senior).

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

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