Exercise C

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Problem explanation

- N people travelling from point A to point B using a bicycle (1 <= N <= 1000)
- 1 – 2 people should ride a bicycle
- Each person has a different speed
- When two people ride a bicycle, the speed depends on the speed of the slower person

Problem explanation

- Minimize the time for the N people to move to point B

Solution explanation

- Main strategy:
  1. Always send the two fastest people first to reduce the return time (from point B back to point A)
  2. When the fastest person returns back to point A alone, send the two slowest people together (minimizes time taken by slow people)
  3. When the two fastest people are both back in point A, send both of them back to point B (to reduce travel time back to A)

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 0

  - Send the two fastest first (1, 3)

A **With bicycle**	**B**
1, 3, 5, 7, 9, 10	

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 3

  - Send the faster one back to A (1)

A	**B** **With bicycle**
5, 7, 9, 10	1, 3

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 4

  - Send the two slowest together (9, 10)

A **With bicycle**	**B**
1, 5, 7, 9, 10	3

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 14

  - Send the fastest person back to A (3)

A	**B** **With bicycle**
1, 5, 7	3, 9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 17

  - Since the two fastest people are back, send them to point B (1, 3)

A **With bicycle**	**B**
1, 3, 5, 7	9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 20

  - Send the fastest one back (1)

A	**B** **With bicycle**
5, 7	1, 3, 9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 21

  - Send the two slowest people to B (5, 7)

A **With bicycle**	**B**
1, 5, 7	3, 9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 28

  - Send the fastest person back to A (3)

A	**B** **With bicycle**
1	3, 5, 7, 9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 31

  - Send the remaining two people back to B (1, 3)

A **With bicycle**	**B**
1, 3	5, 7, 9, 10

Solution explanation

- Example:
  - 1, 3, 5, 7, 9, 10
  - Total time taken: 34

  - DONE!!!!

A	**B** **With bicycle**
	1, 3, 5, 7, 9, 10

Solution analysis

- Pros:
  - Minimizes the time taken by slow people
  - Reduces travel time by taking advantage of the two fastest people

- Cons
  - Possible inefficiency in an unsorted list of time

Solution analysis

- Favorable inputs:
  - A sorted array of integer numbers

Thank you!