# CS 2104
# Introduction to Problem Solving

# Verbal Reasoning

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Slides based on the "Problem Solving and Comprehension" book
some slides created by Layne T. Watson

# Verbal Reasoning Problems

- For this type of problem, we need to parse the text into the proper steps

- Then we need to sort out the steps

- Since they can get long and complicated, we usually need to resort to a diagram (externalize the information)
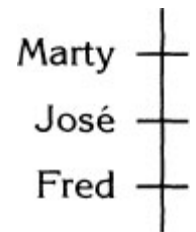
# VR  Problem 1

Jose is heavier than Fred but lighter than Marty. Write their names in order of weight.

# VR  Problem 1  Solution

- To expose the reasoning process, we need to spell out the steps involved.

- Step 1: Jose is heavier than Fred… [He would be placed above Fred on the diagram.]
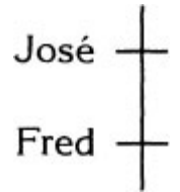
  José ┼
  Fred ┼

- Step 2: … but lighter than Marty. [So Marty is placed above Jose in the diagram.]
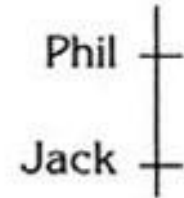
  Marty ┼
  José ┼
  Fred ┼

# VR Problem 2

Jack is slower than Phil but faster than Val. Val is slower than Jack but faster than Pete. Write the names in order of speed.
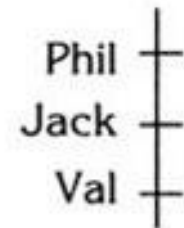
# VR  Problem 2  Solution

Step 1. Jack is slower than Phil . . . He would be placed below Phil.

Phil ┼
Jack ┼

Step 2. . . . but faster than Val.

This says Jack is faster than Val. So Val is added below Jack.
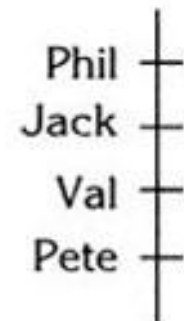
Phil ┼
Jack ┼
Val ┼

Step 3. Val is slower than Jack . . .
This is already represented in the diagram.

Step 4. . . . but faster than Pete.

Val is faster than Pete, so Pete is added to the diagram below Val.
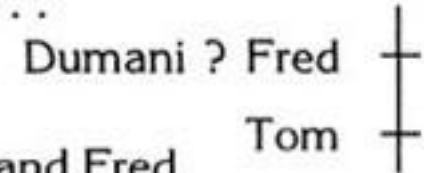
Phil ┼
Jack ┼
Val ┼
Pete ┼

# VR  Problem 3

If Dumani and Fred are both richer than Tom, and Hal is poorer than Dumani but richer than Fred, which man is the poorest and which one is the next poorest? Write the names of all 4 men in order.
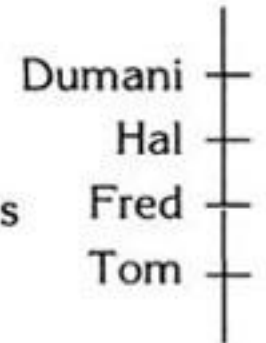
# VR  Problem 3   Solution

*Step 1.* If Dumani and Fred are both richer than Tom . . .

Dumani ? Fred ┼

Tom ┼

The problem does not indicate whether Dumani and Fred
are actually equal to each other. So they are represented
on the diagram with a question mark between them, and
with both of them above Tom.

*Step 2.* . . . while Hal is poorer than Dumani but richer than
Fred . . .

Dumani ┼

Hal ┼

This means that Dumani and Fred are not equal; Hal is
between them, with Dumani the richest.

Fred ┼

Tom ┼

Tom is the poorest and Fred is next poorest.

# VR  Problem 4

- Paul and Tom are the same age. Paul is older than  Cynthia. Cynthia is younger than Hal.

- Is Paul older or younger than Hal – or can this not be  determined from the information?

# Other Diagrams

- Some problems are best supported by a 2D table.

- Some problems need another approach to organizing the information, such as a graph.

# VR  Problem 5

Three fathers – Pete, John, and Nick – have between them a total of 15 children of which 9 are boys. John has 1 more child than Pete, who has 4 children. Nick has 4 more boys than girls and the same number of girls as Pete has boys. How many boys each do Nick and Pete have?

# VR  Problem 5  Solution

```
              Boys          Girls          Total
------------------------------------------------
Pete

------------------------------------------------
John

------------------------------------------------
Nick

------------------------------------------------
Total
```

# VR  Problem 6

On a certain day I ate lunch at Tommy's, took out 2 books from the library (The Sea Wolf and Martin  Eden, both by Jack London), visited the museum  and had a cavity filled. Tommy's is closed on  Wednesday, the library is closed on weekends, the museum is only open Monday, Wednesday,  and Friday, and my dentist has office hours  Tuesday, Friday, and Saturday. On which day of  the week did I do all these things?

# VR  Problem 7

- Boris, Irwin and Steven are engaged in the occupations of librarian, teacher, and electrician,  although not necessarily in that order. The  librarian is Steven's cousin. Irwin lives next door  to the electrician. Boris, who knows more facts
- than the teacher, must drive 45 minutes to visit  Irwin's house.

- What is each man's occupation?

# VR  Problem 8

Sally loaned $7 to Betty. But Sally borrowed $15 from Estella and $32 from Joan. Moreover, Joan owes $3 to Estella and $7 to Betty. One day the women got together at Betty's house to straighten out their accounts. Which woman left with $18 more than she came with?

Step 1. The problem began "Sally loaned $7.00 to Betty." This is shown below with the arrow indicating the direction to which the money must be returned.

VR     Problem 8

Solution

Step 2. The entire pattern of debts is shown in the following diagram.
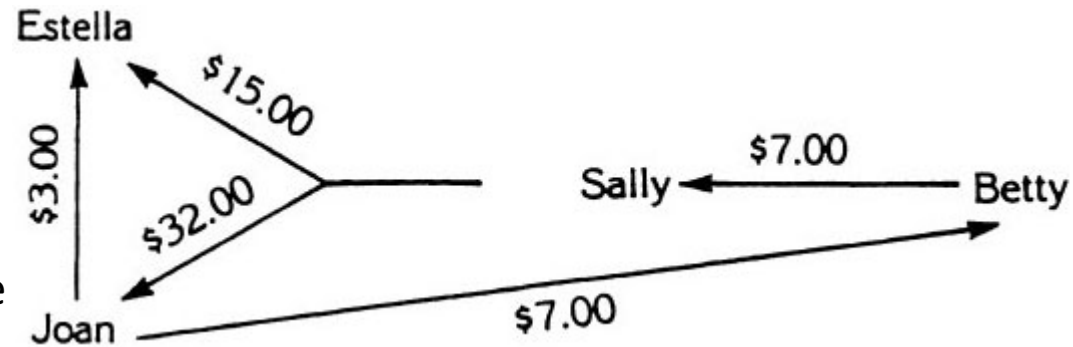


Step 3. Which girl left with $18.00 more than she came with?

The diagram shows that Estella received $3.00 from Joan and $15.00 from Sally, for a total of $18.00.

Estella left with $18.00 more than she came with.

# VR Problem 9

Lester has 12 times as many marbles as Kathy. John has half as many as Judy. Judy has half as many as Lester. Kathy has 6 marbles. How many marbles each do Lester and John have? You do not need to use algebra to solve this problem.

# Six Myths about Reading

What speed-reading advocates say:

1. Don't subvocalize when you read
2. Read only the key words
3. Don't be a word-by-word reader
4. Read in thought groups
5. You can read at speeds of 1000 or more words a minute – without any loss of comprehension
6. Don't regress or re-read

These things do not work.

There are no short cuts to comprehension!

Difficult material typically requires re-reading to understand.

# Multitasking



See notes in the file Multitasking.pptx.