

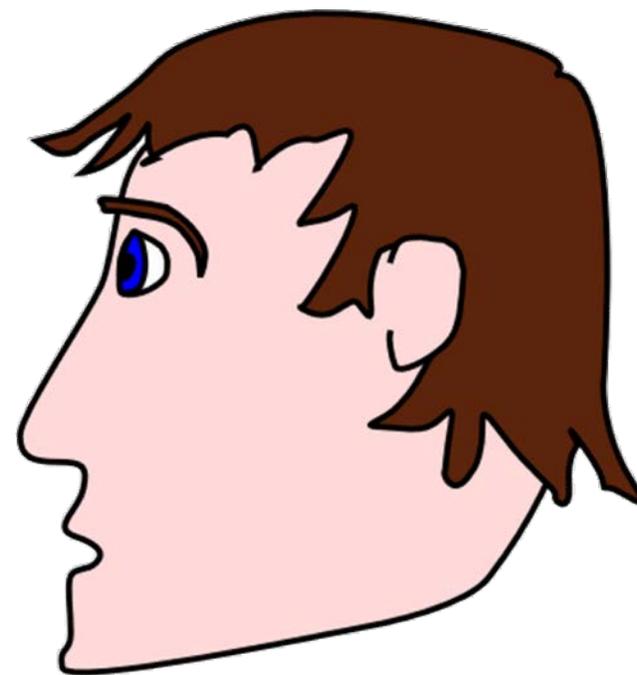
# An eclectic introduction to assurance cases

C. Michael Holloway

originally created as multiple files in 2014/2015  
combined in this form 2019-02-26

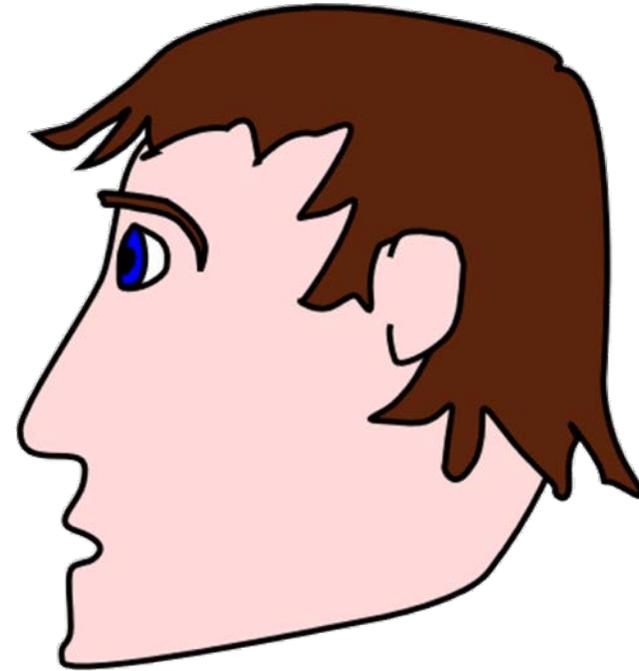
*Images are in the public domain via CCo 1.0 Universal (CCo 1.0).  
Downloaded from pixabay.com*

This is Jon



This is Jon's dad

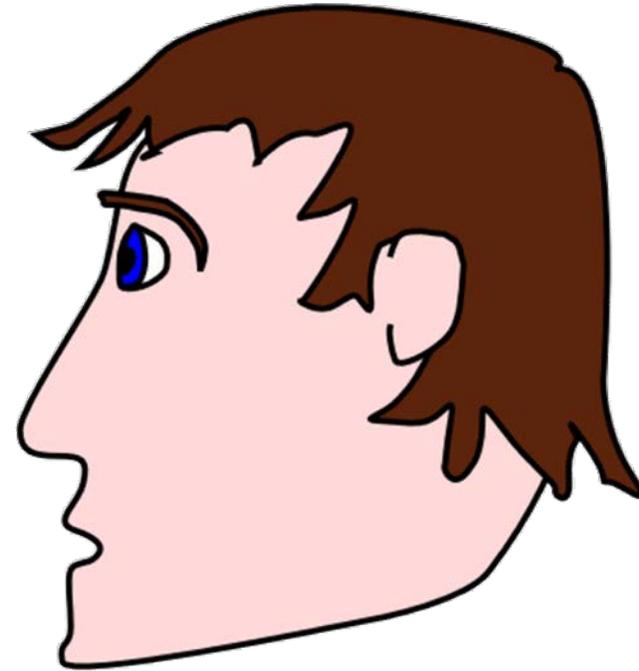
Tim will give  
me a ride to  
the game.



Tim will give  
me a ride to  
the game.



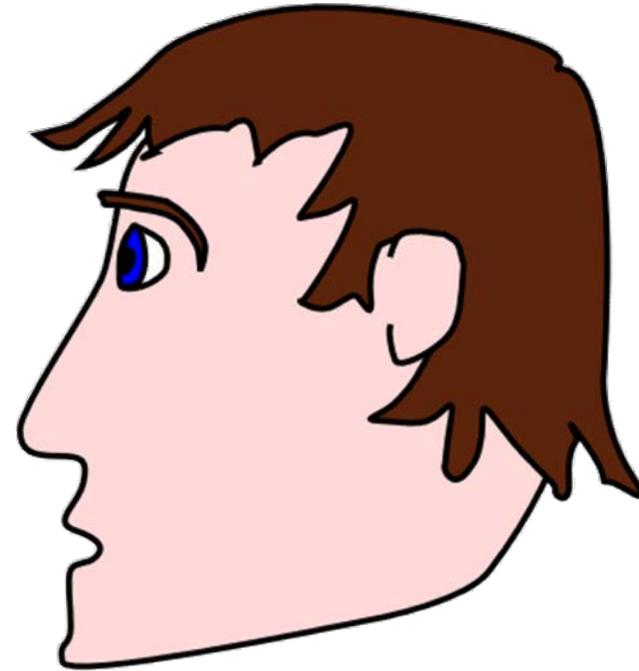
Is he a  
safe driver?



Yes, he is.



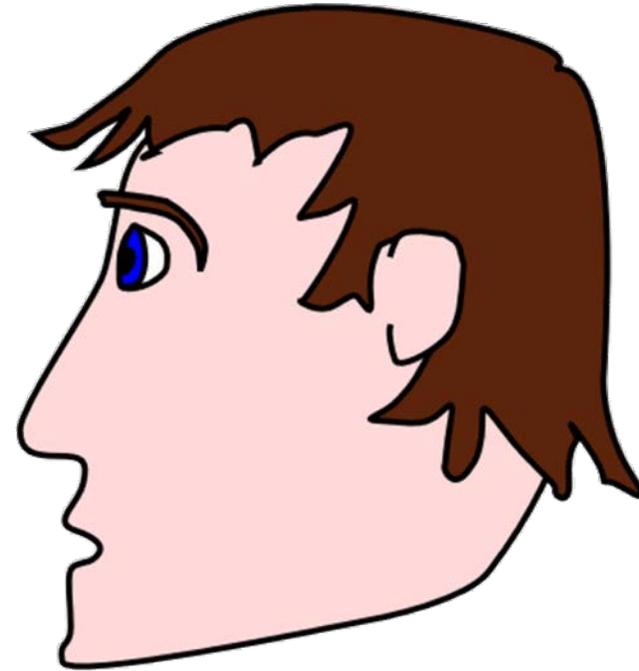
How do  
you know?



It's just one of  
those things  
I know.



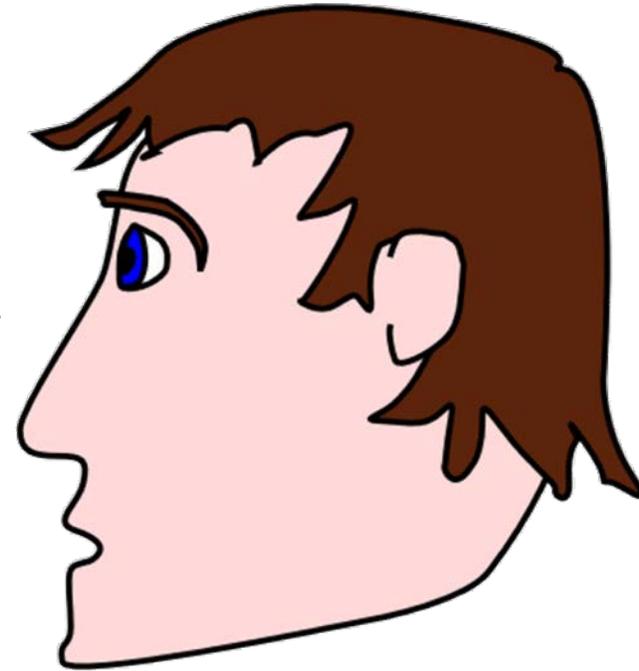
That's not  
good  
enough.  
Try again.



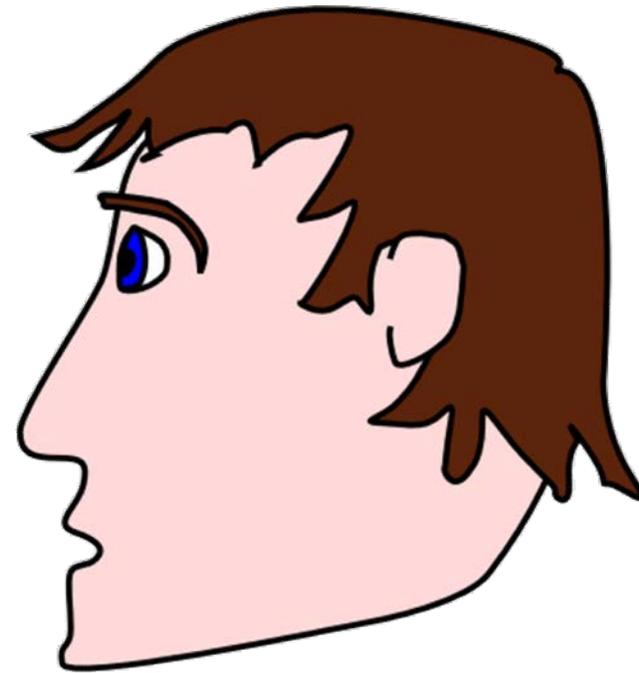
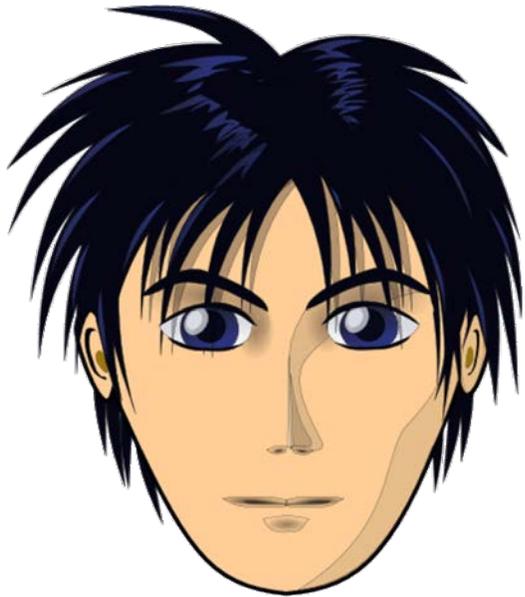
No one says  
he's *not* a  
safe driver.



How many  
people  
have you  
asked?



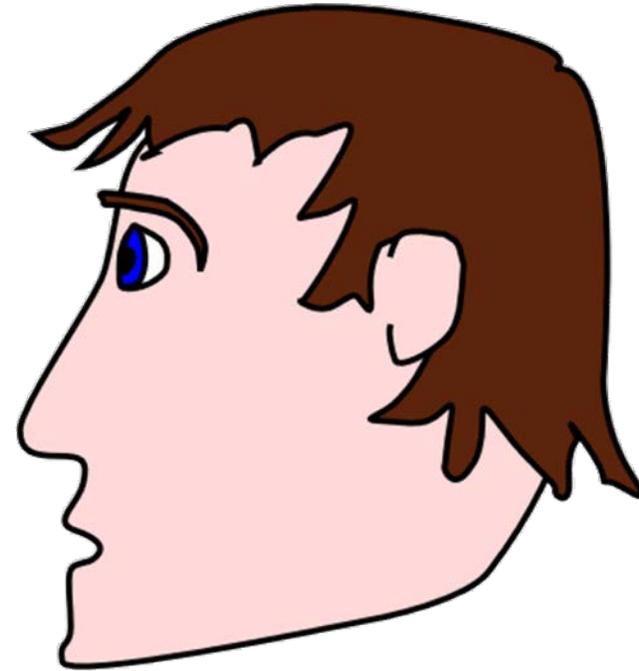
Um, ...  
well, one,  
but ...



... He passed the state test to get a license, so he must drive safely.



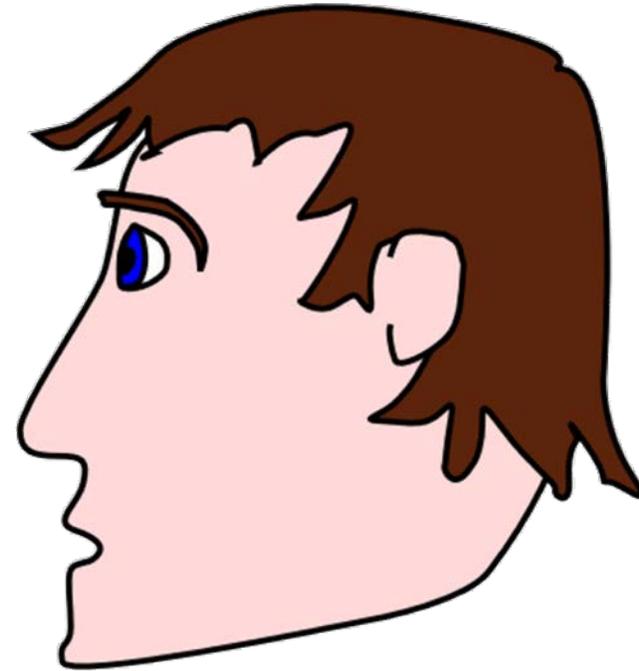
Just being legal doesn't mean he's safe.



Well, Dad, what's  
gonna convince  
you to let me  
ride with Tim?



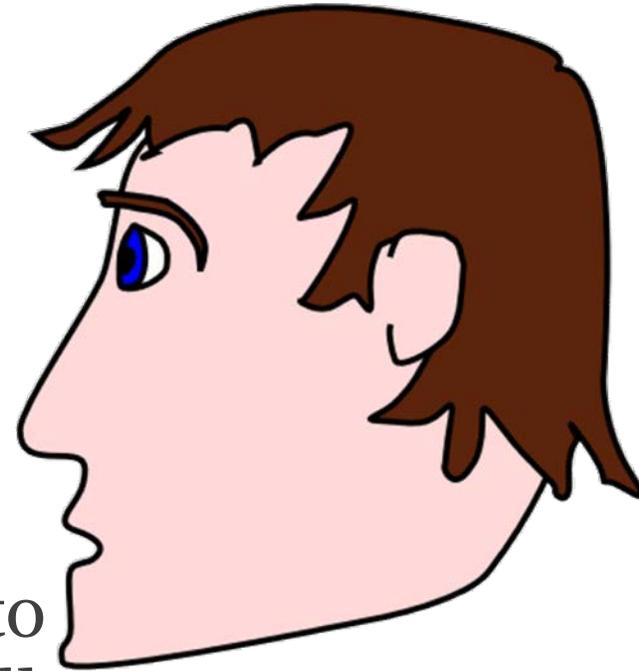
Reasons ...



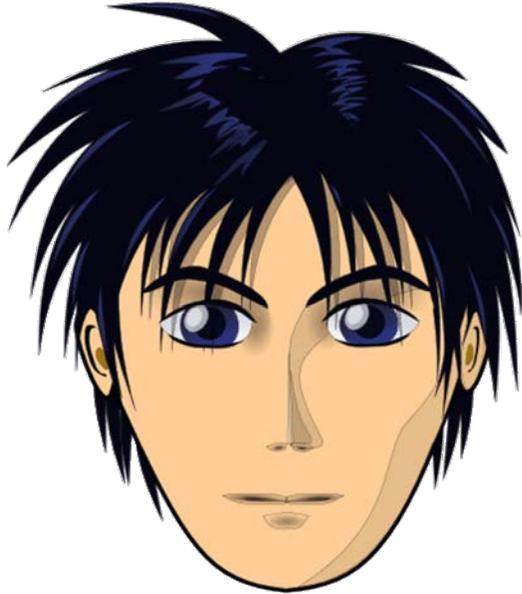
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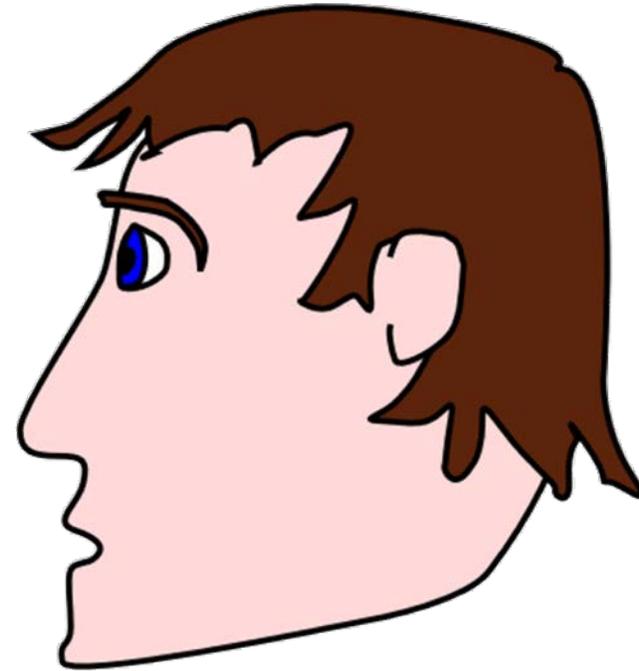
Reasons ...  
Good reasons to  
believe Tim will  
get you there and  
back in one piece.



Well, Dad, what's  
gonna convince  
you to let me  
ride with Tim?



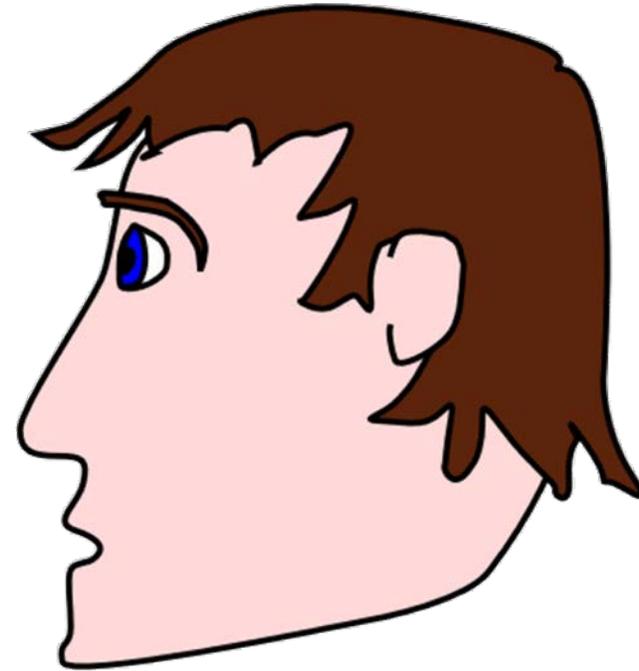
Or, in other  
words,  
I want an  
***assurance  
case.***



I'll ask Tim  
if he has  
one.



Or, in other  
words,  
I want an  
***assurance  
case.***



*Does Tim have an assurance case?*

*If so, will Jon's dad let him ride with Tim?*

*Who's playing in the game?*

*What sport are they playing?*

*Who will win the game?*

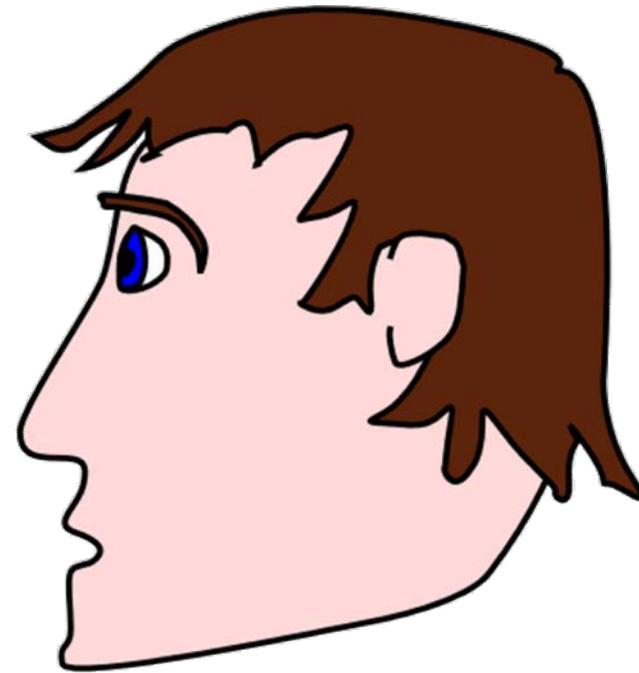
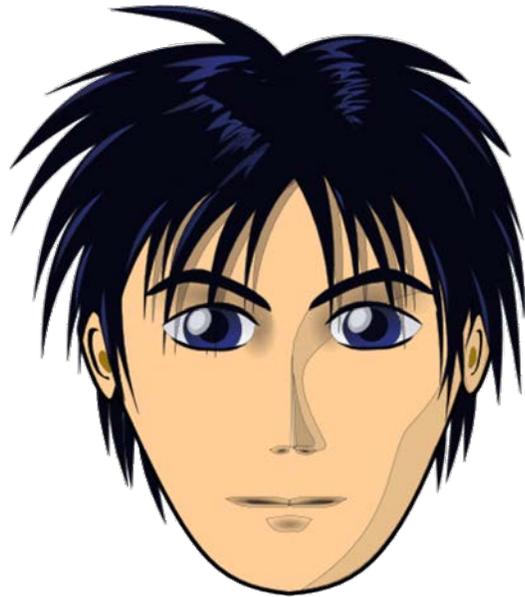
*Will Jon get home safely?*

*And . . .*

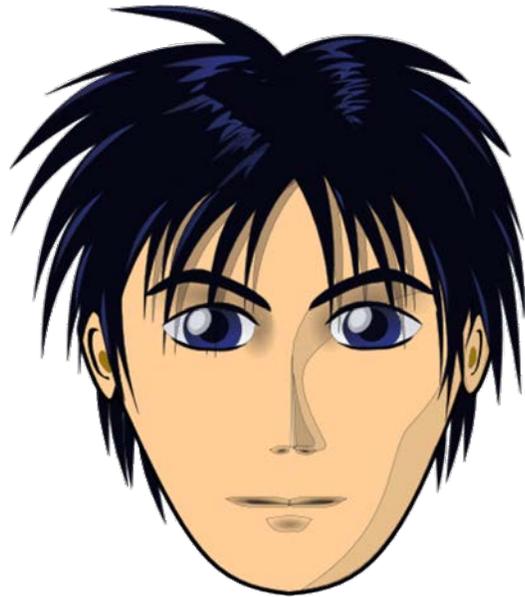
*What about Naomi?*

*We rejoin our friends a few hours later*

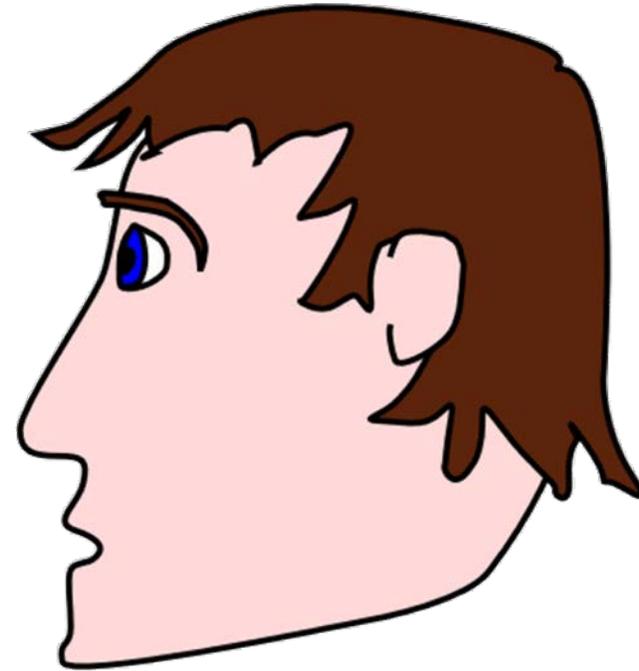
I asked Tim about  
an assurance case.



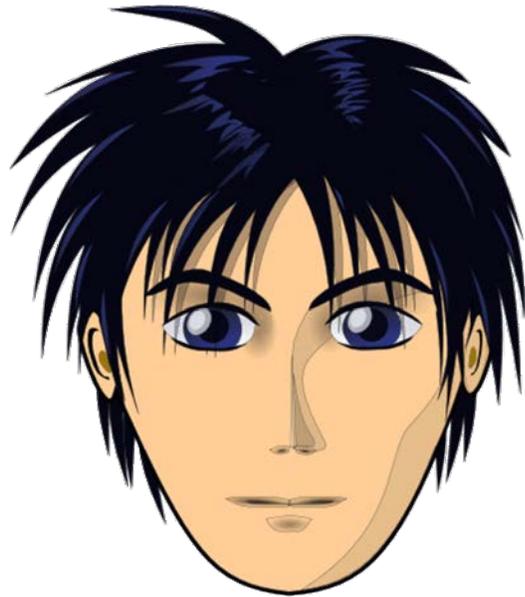
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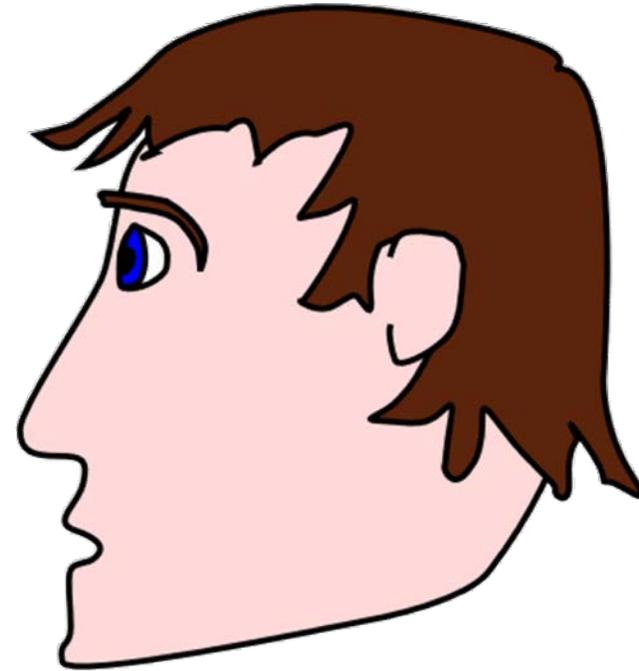
What did he  
have to say?



He was a tad  
confused.



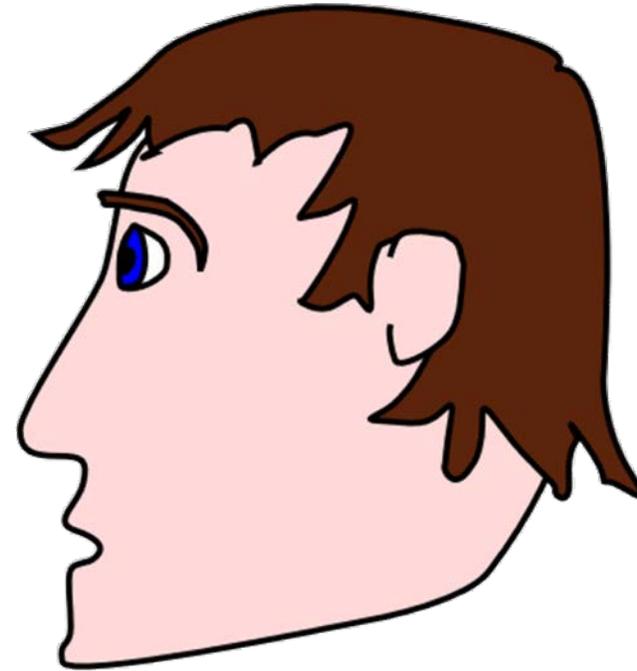
I thought he  
might be.  
What was he  
confused  
about?



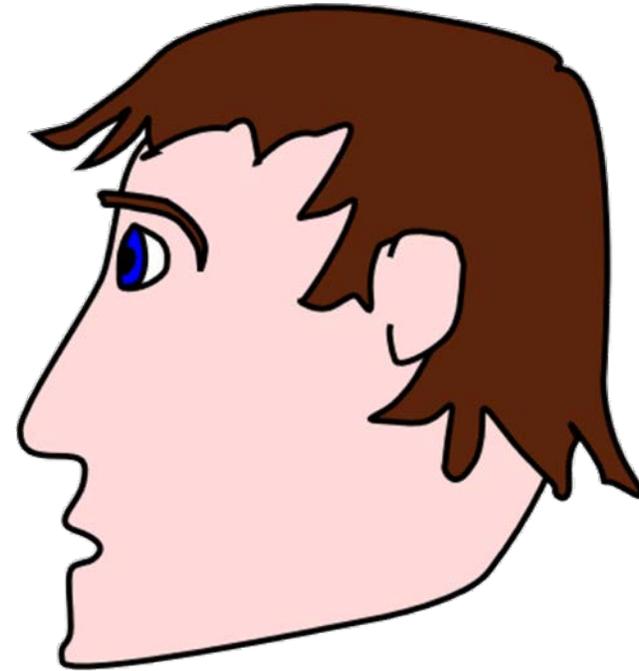
Whether an assurance case is the same thing as a safety case. ...



Then he's heard about safety cases?



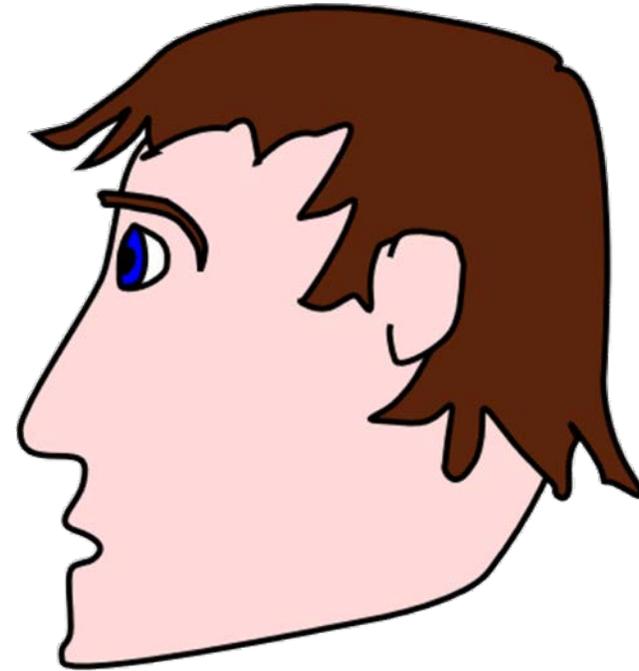
Yes, from his  
sister Rose, who  
lives in Cardiff in  
the UK



Yes, from his  
sister Rose, who  
lives in Cardiff in  
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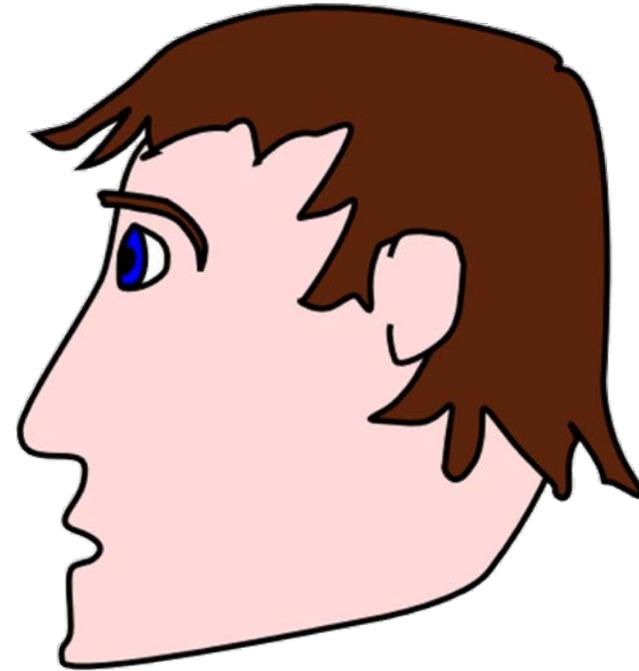
That's where  
it all started,  
you know.



Yes, from his  
sister Rose, who  
lives in Cardiff in  
the UK

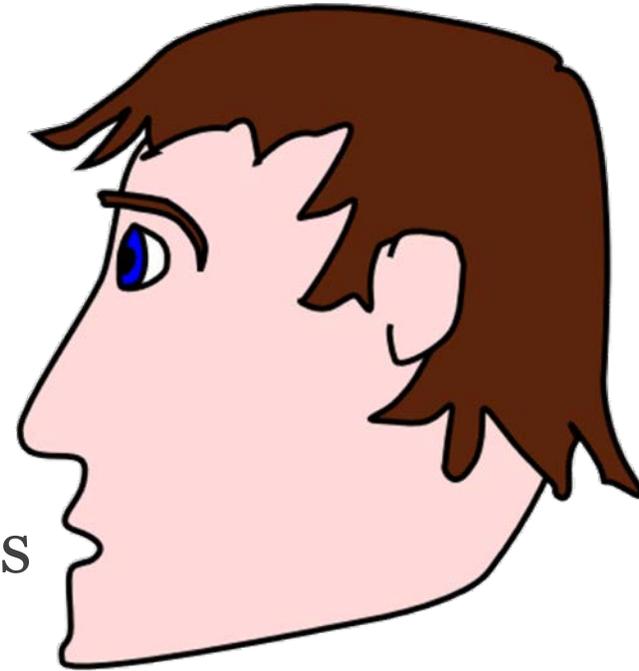


Not Cardiff,  
but in the UK.



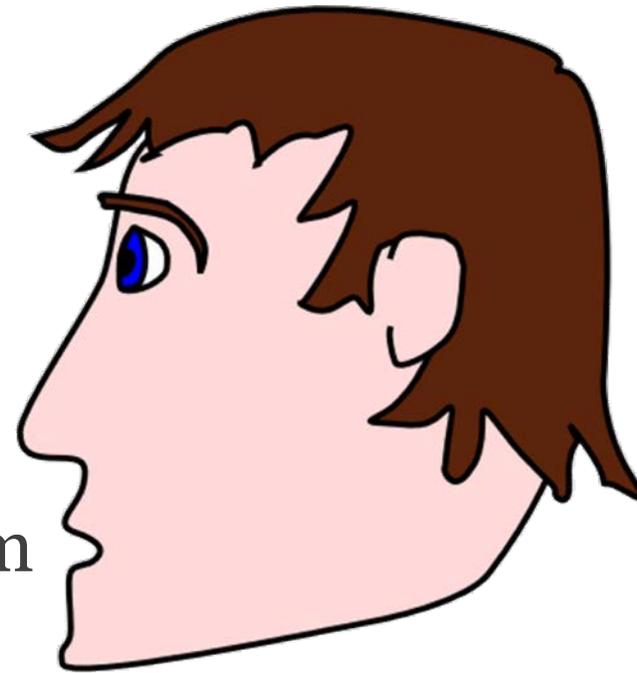


Safety cases  
came first.  
Assurance cases  
are a more  
general term.

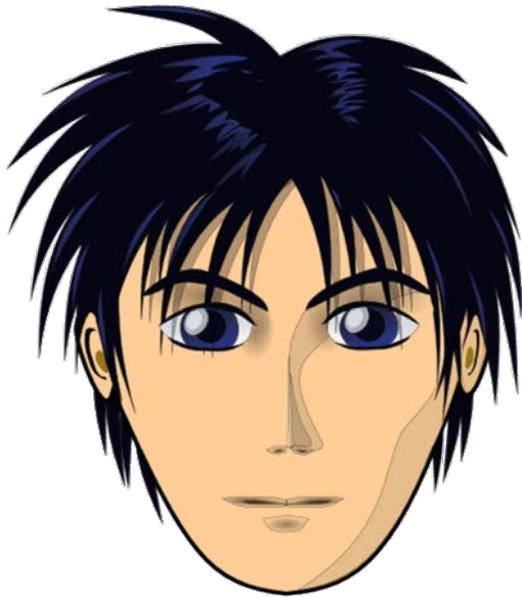




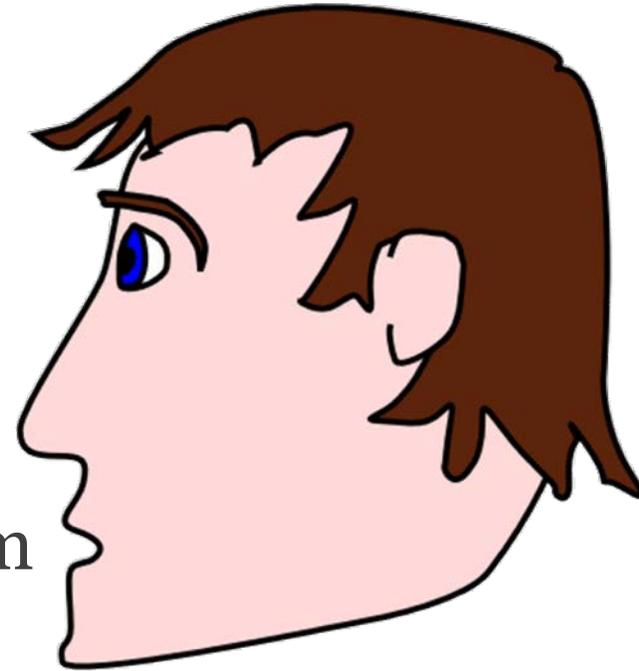
All I really  
need from Tim  
is a simple  
safety case.



That should  
make Tim happy.  
Thanks dad!

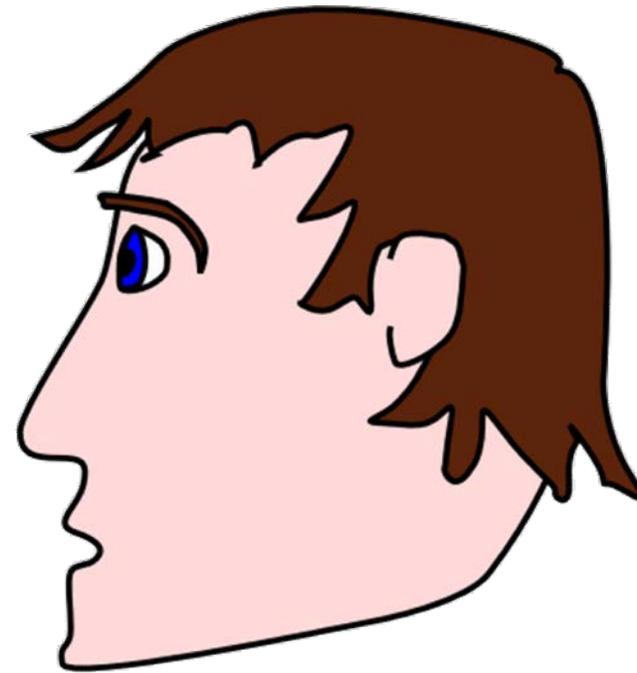


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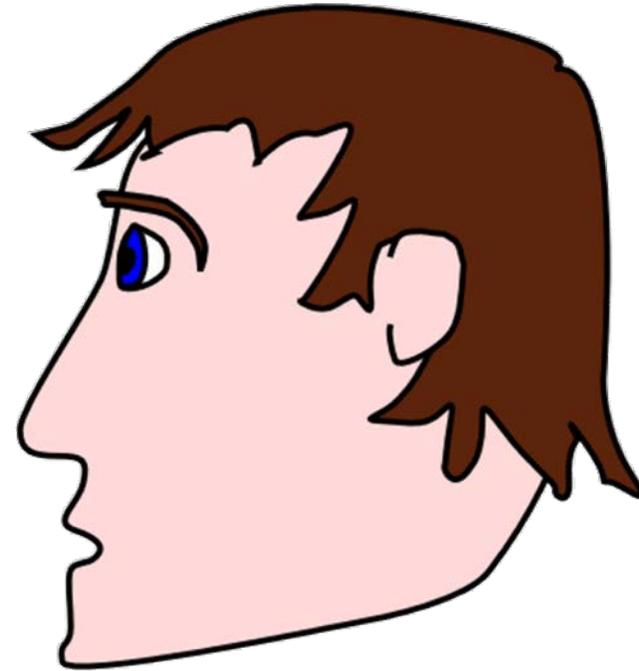


Oh, Dad, I  
almost forgot

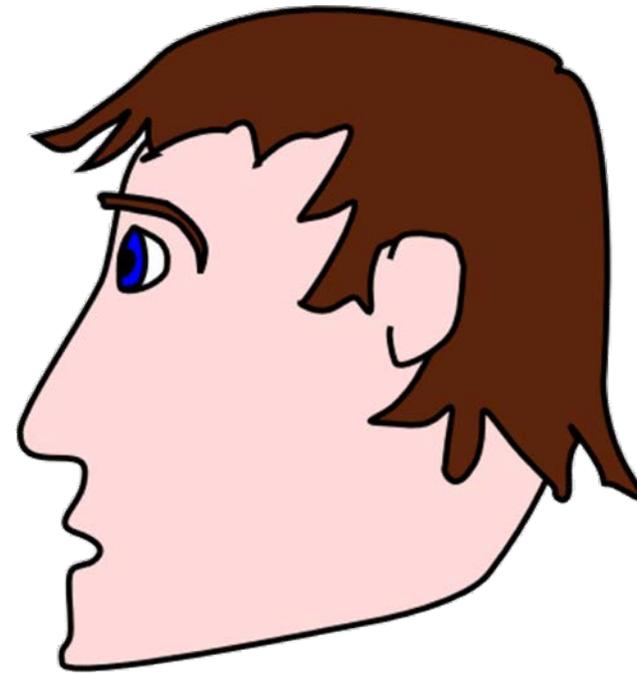
...



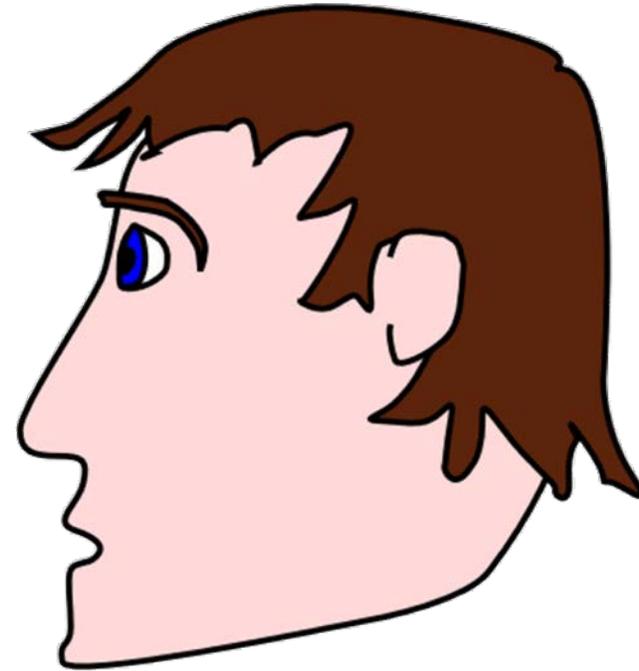
... Tim also  
wondered ...



... if you want  
a *brief* case ...



... if you want  
a *brief* case ...  
or a long one.

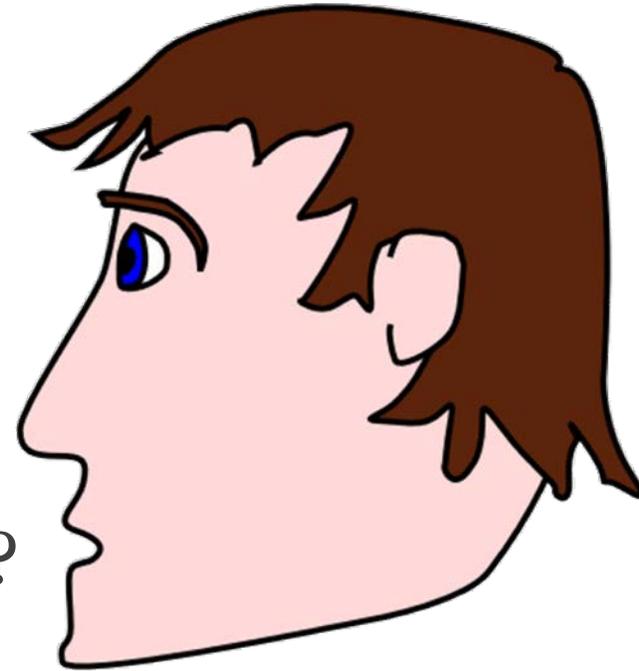


*... the conversation continues ...*

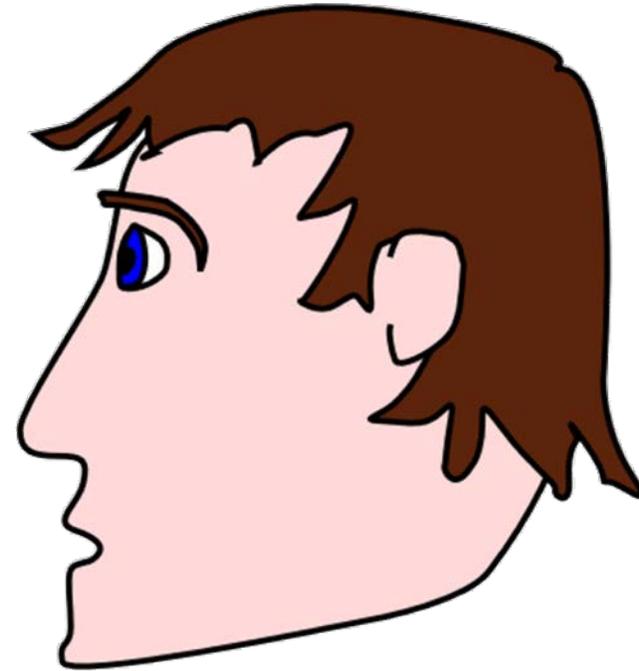
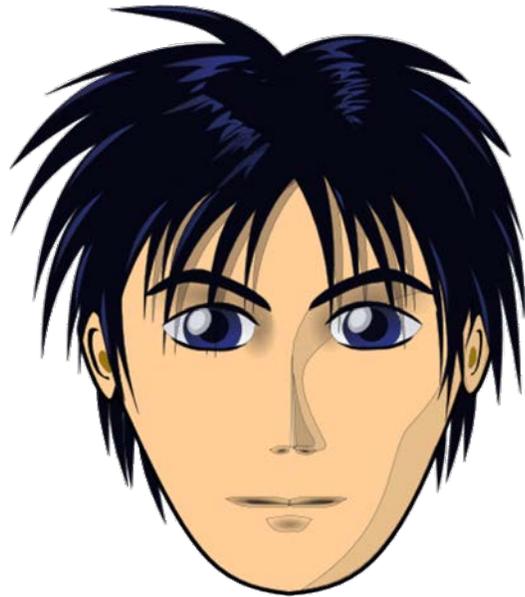
... if you want  
a *brief* case ...  
or a long one.



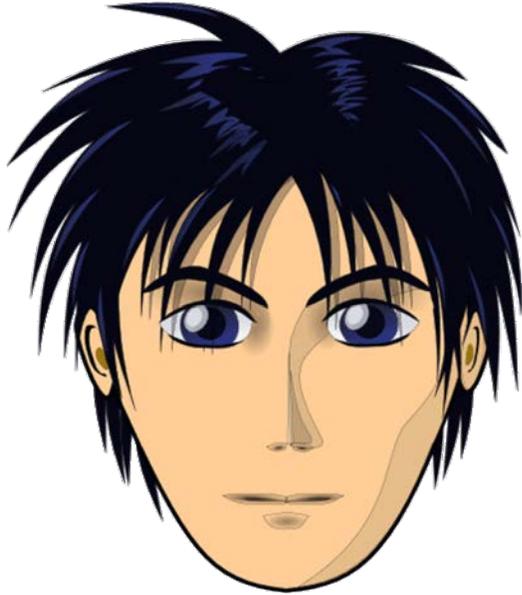
Did he really  
ask it like that?



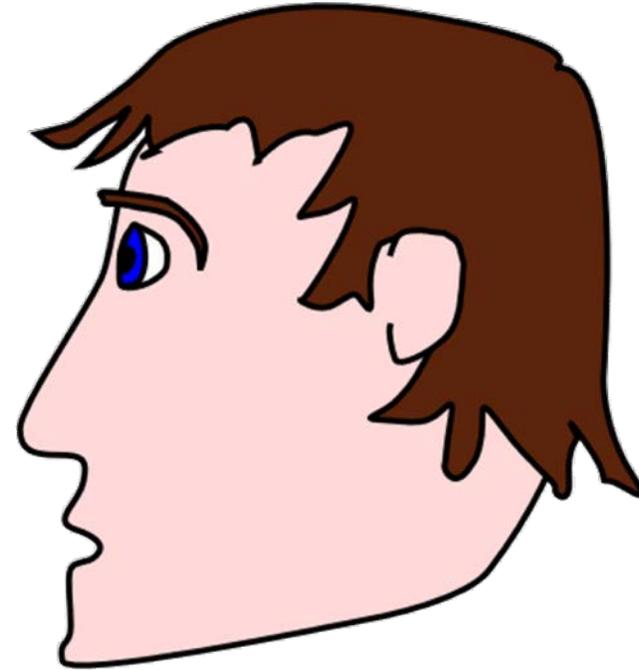
Well, no,  
of course not  
He's not as funny  
as I am.



Well, no,  
of course not  
He's not as funny  
as I am.



So, what did  
he really want  
to know?

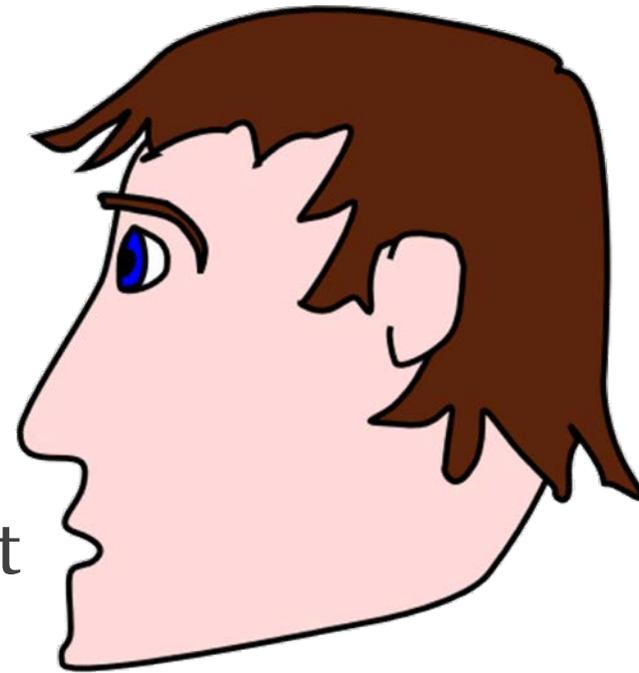


He wanted more details about what you're expecting.



That's simple.

I want a cogent argument.

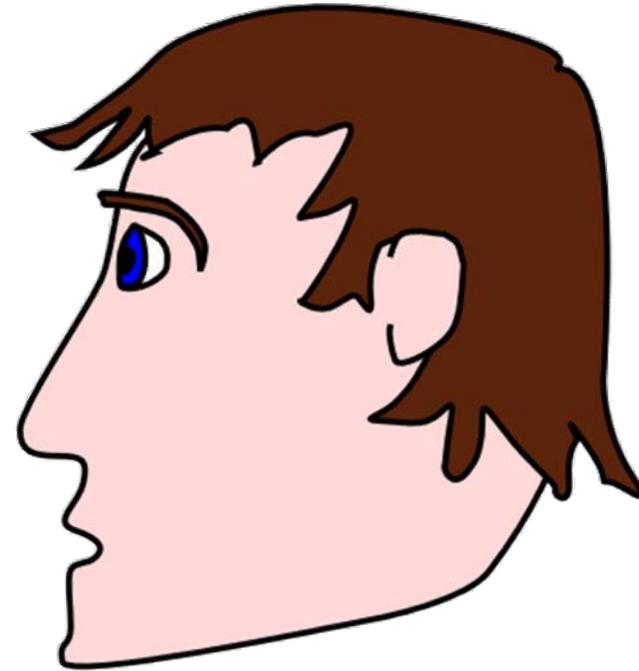


Simple? ...  
How will Tim know  
what you'll think is  
cogent?



Well ...  
there's one  
surefire way  
he'll know

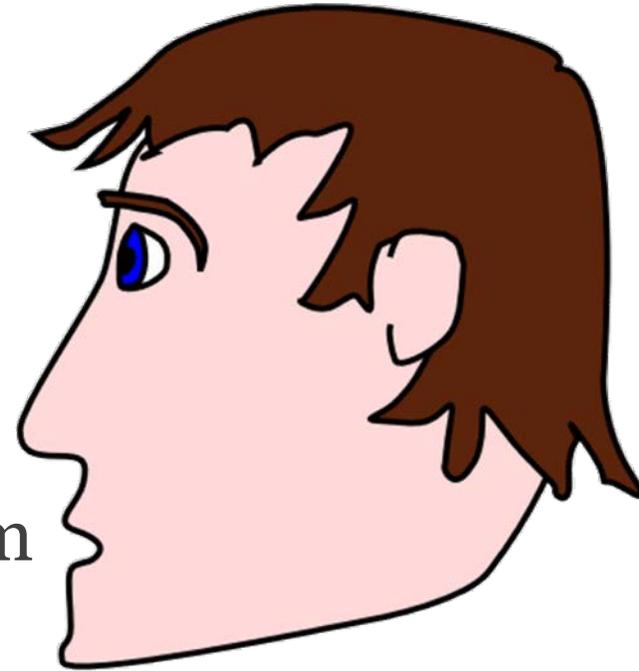
...



What's that?



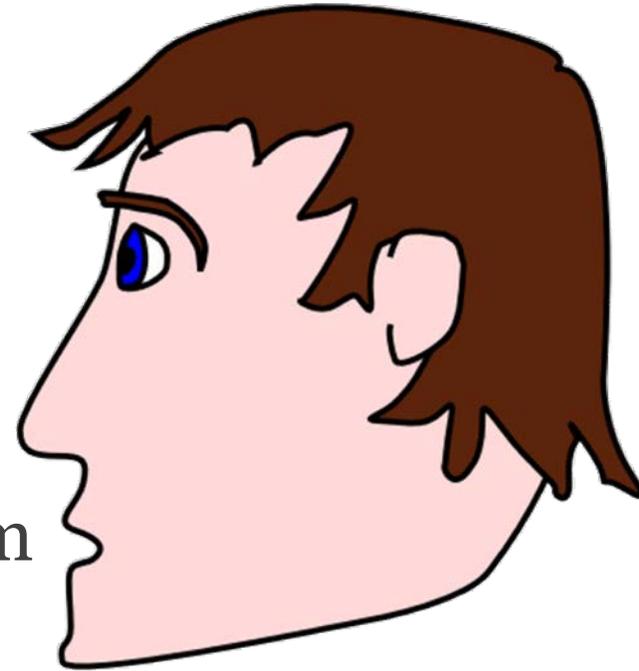
If you're in  
the car with him  
riding to the  
game.



Cute Dad ...  
but that's a bit late  
to find out,  
don't ya think?



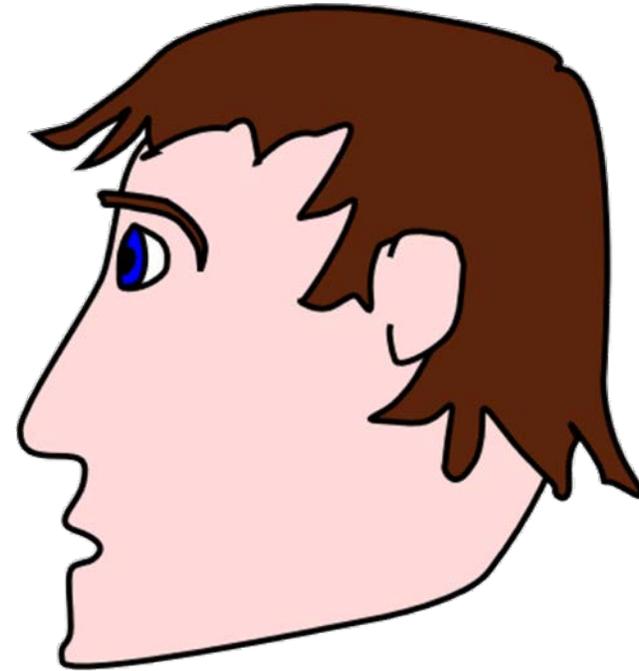
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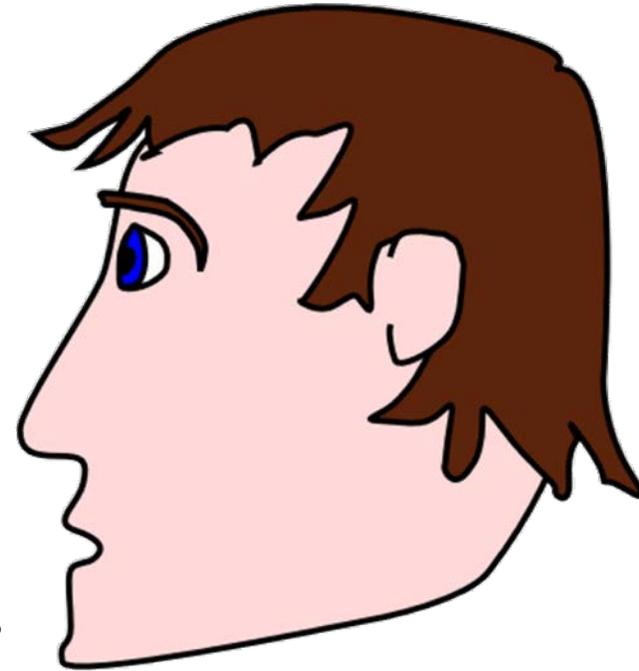


Yeah, sorry ...  
there really  
isn't a simple  
answer.





Deciding  
if a case is  
good enough  
can be rather  
tough.

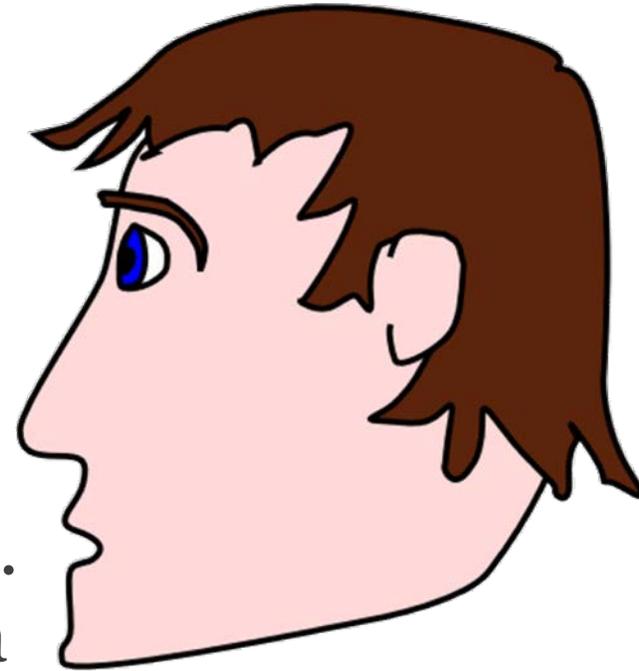


*... a few minutes later ...*

How tough is it  
to *create* the case  
in the first place?



Hmmm.  
Good question.  
I guess it sorta  
depends.

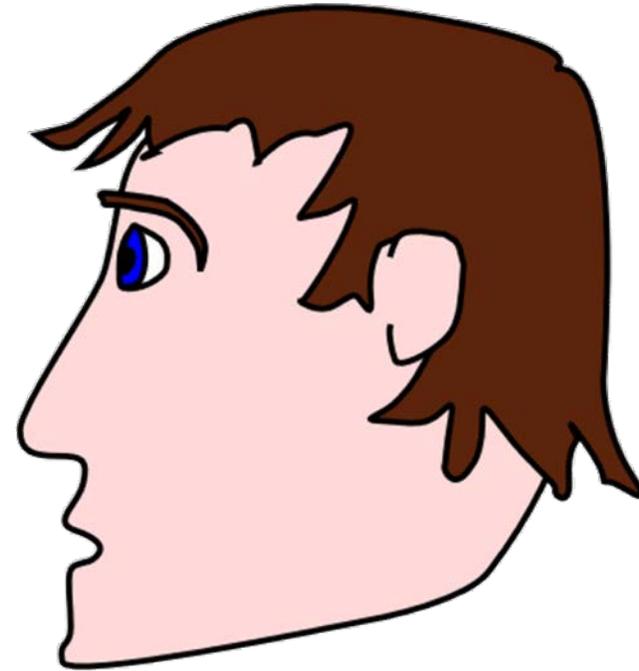


It sorta depends  
on what?



Lots of things

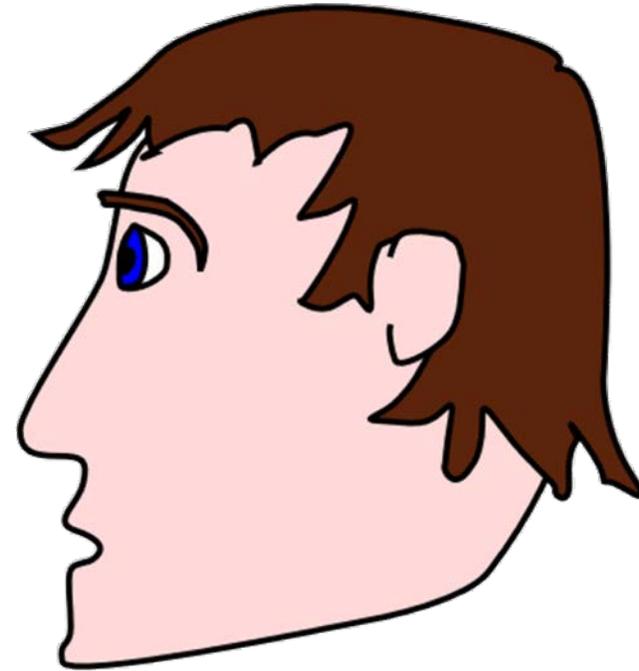
...



It sorta depends  
on what?



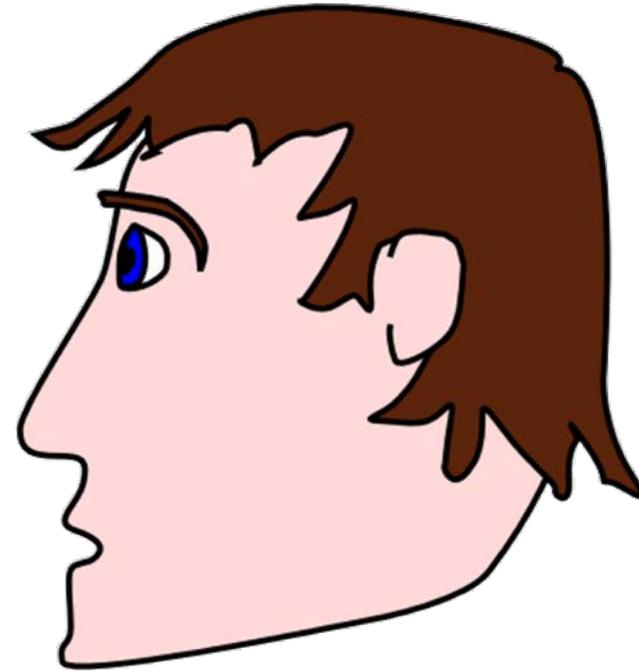
Lots of things  
...  
what the case  
is trying to  
show ...



It sorta depends  
on what?



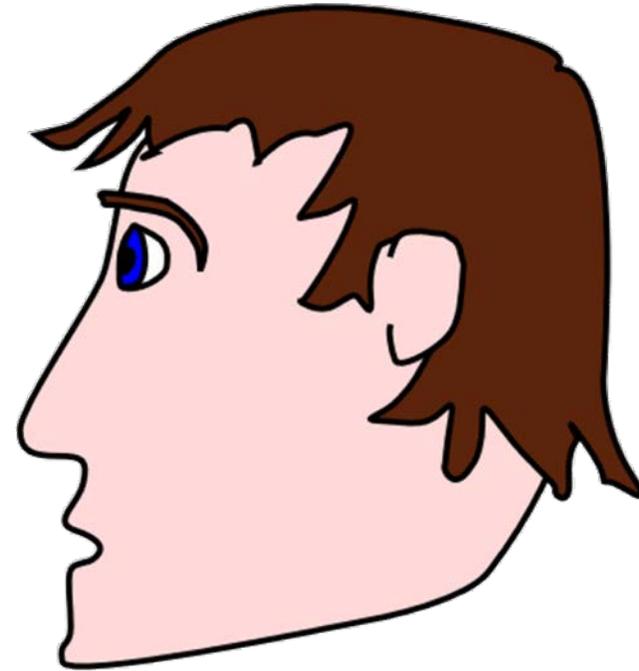
Lots of things  
...  
what kind of  
evidence you  
have ...



It sorta depends  
on what?



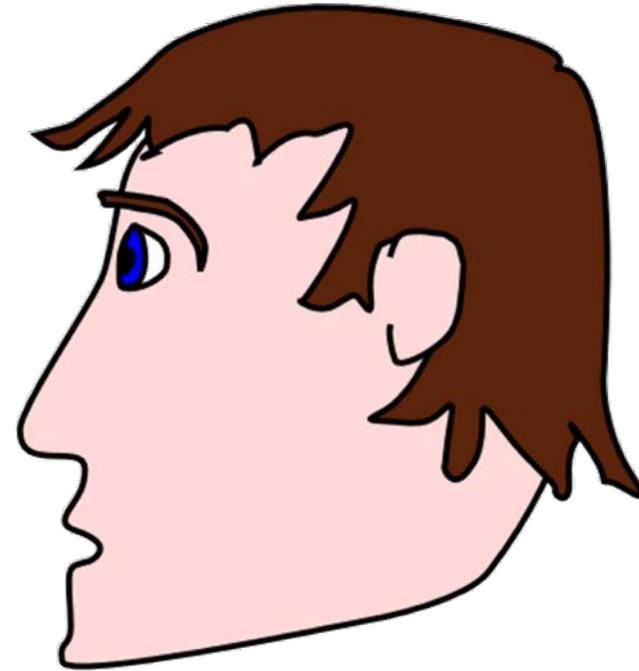
Lots of things  
...  
who you're  
trying to  
convince ...



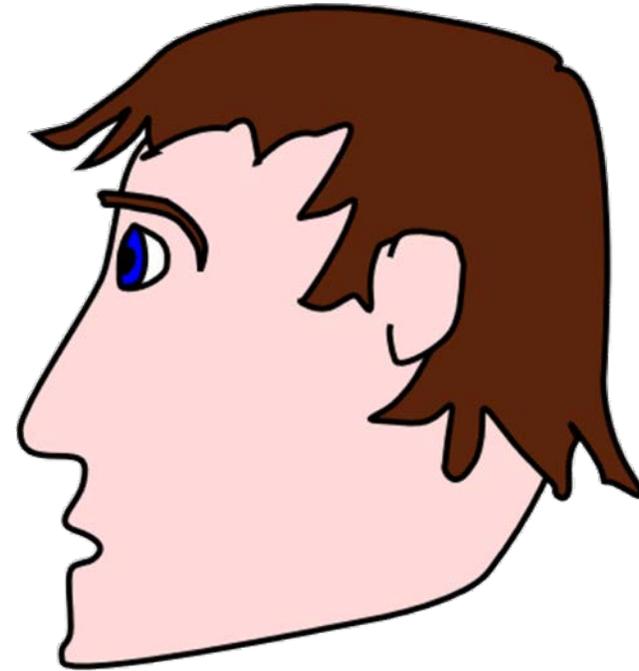
I'm trying to  
convince you Dad,  
remember?



That you are,  
my son. ...  
'Tis probably  
best to  
just give up now.



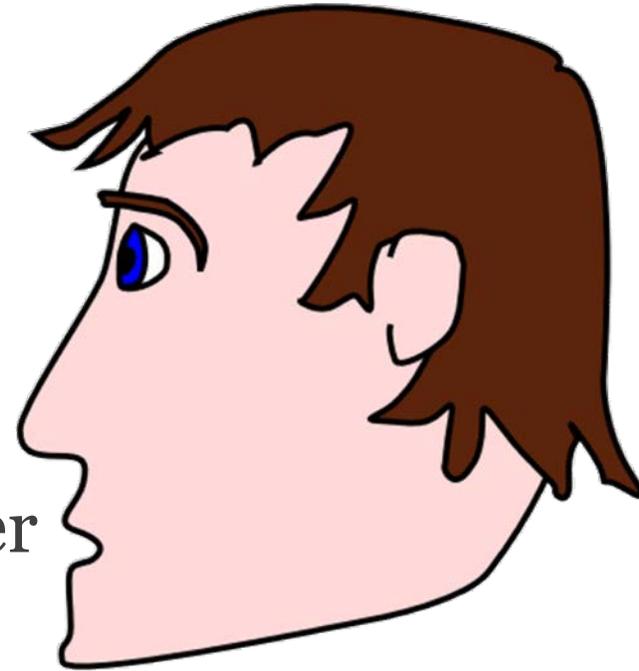
I don't wanna give up!  
Tim's my only hope  
for getting to the game!



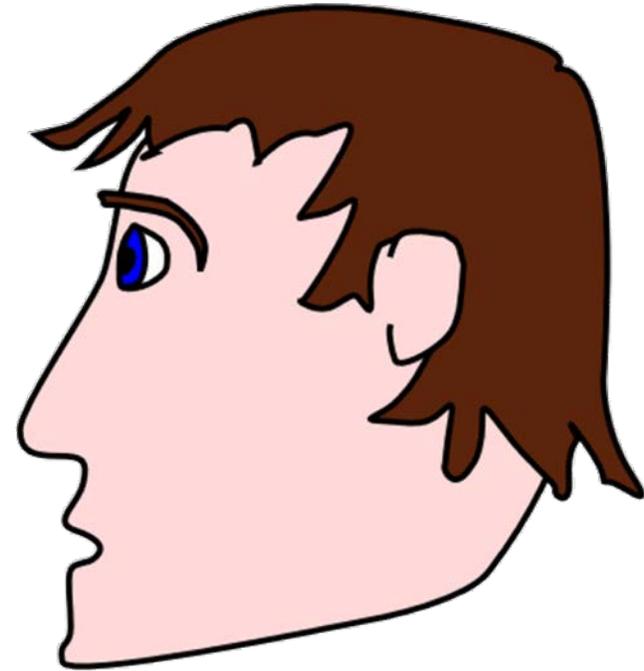
I don't wanna give up!  
Tim's my only hope  
for getting to the game!



No,  
there is another  
...



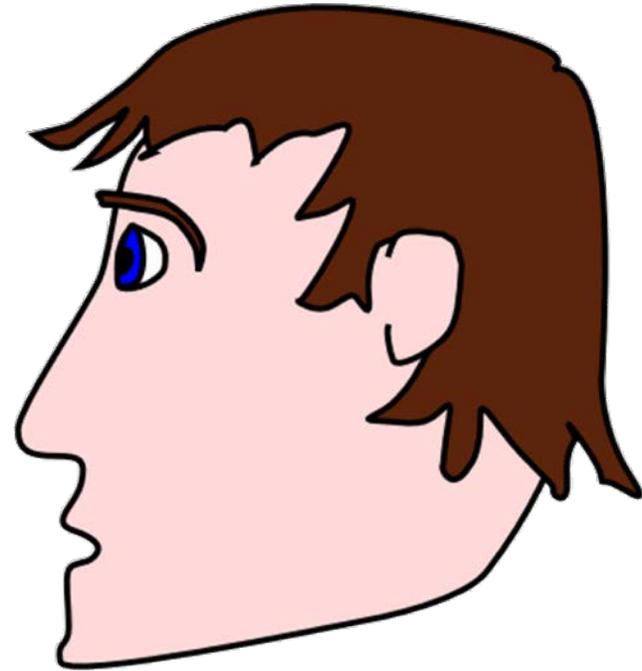
Huh?



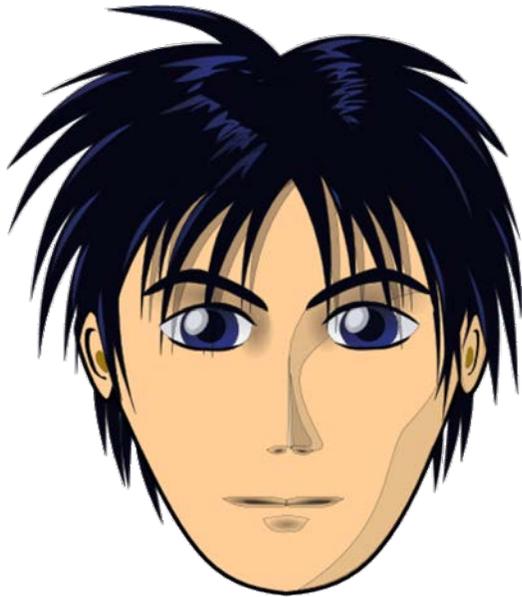
Huh?



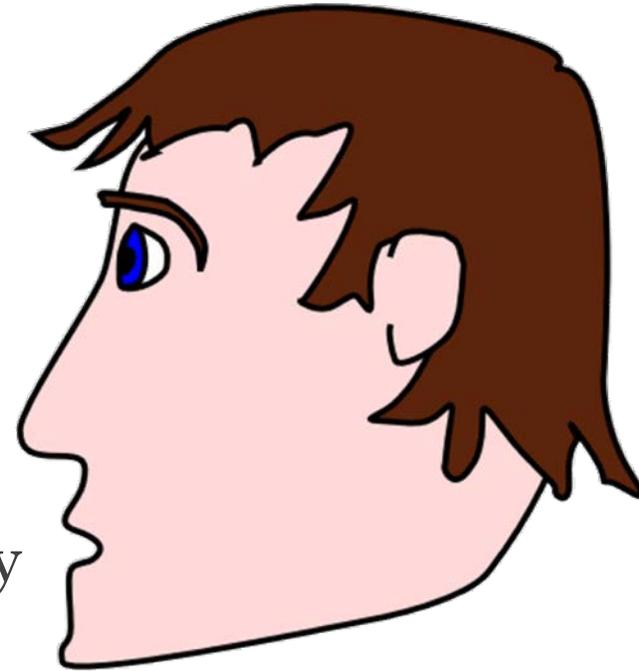
Never mind.



Huh?

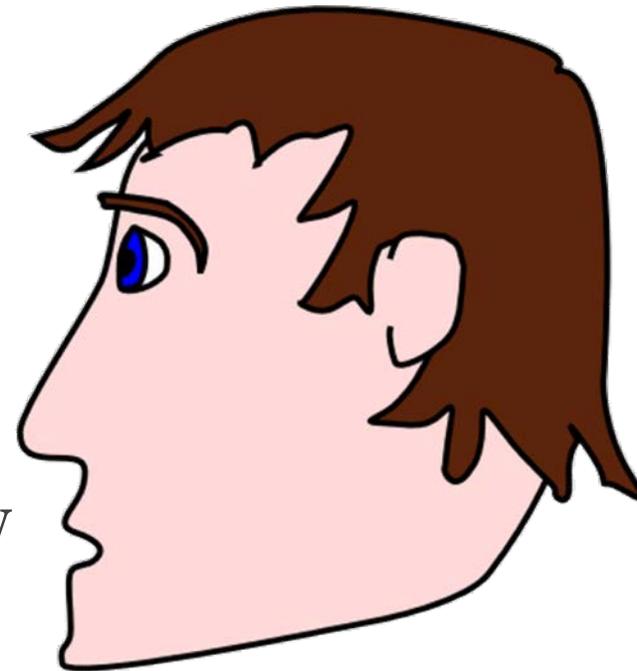


Never mind.  
I was far far away  
for a second ...





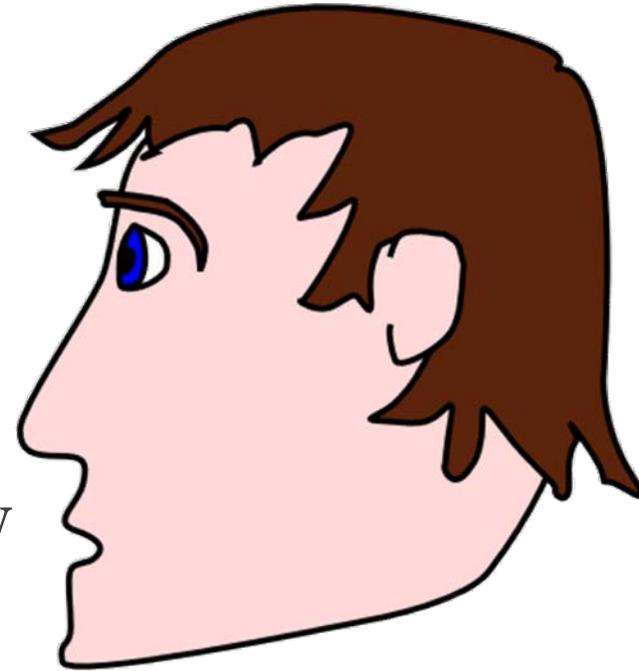
I'll show you how  
to create a case  
to convince me ...



Thanks Dad!



I'll show you how  
to create a case  
to convince me ...

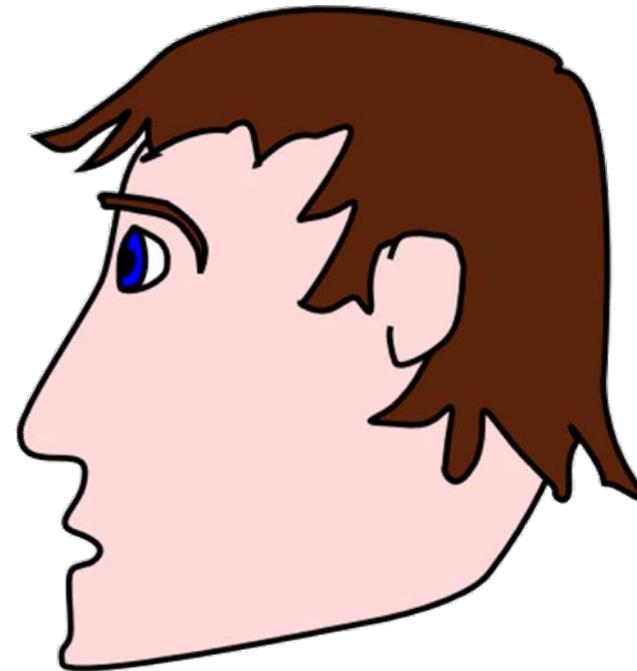


*We rejoin Jon & his dad two days later*

I'm so stoked  
our case  
convinced you!  
Can't wait 'til Friday!



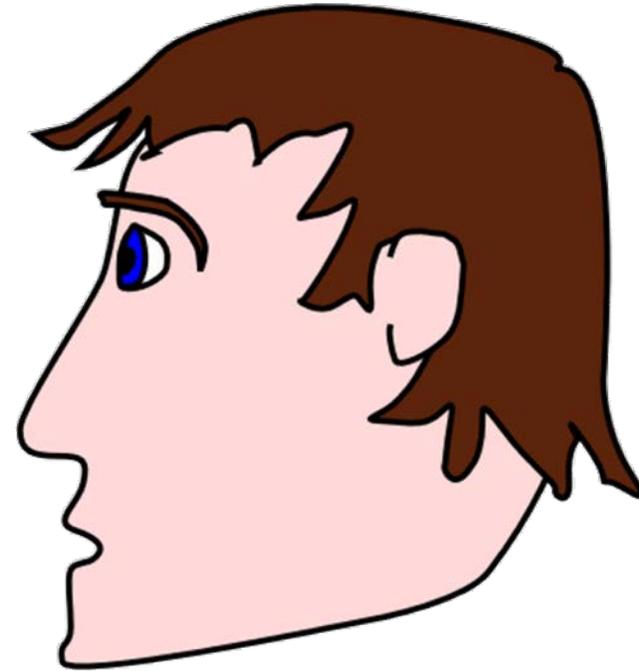
I'm happy for  
you, too, Jon.  
Hope y'all win.



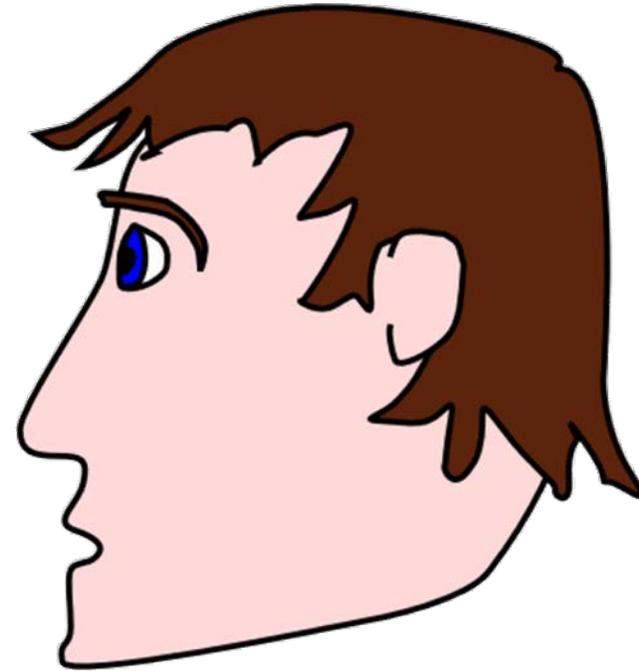
One more question ...  
then I've gotta  
do homework ...



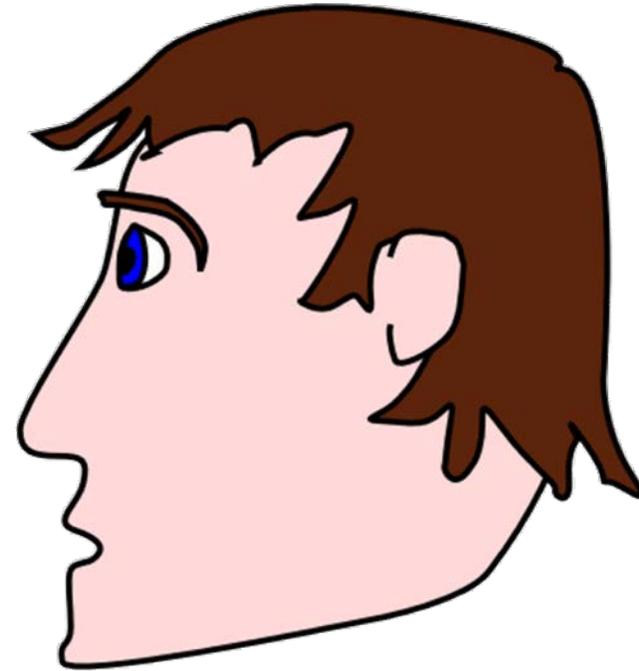
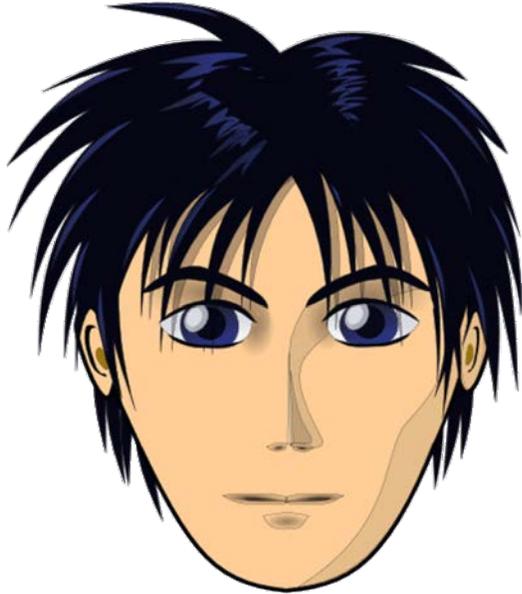
O.K.  
Let's hear it.



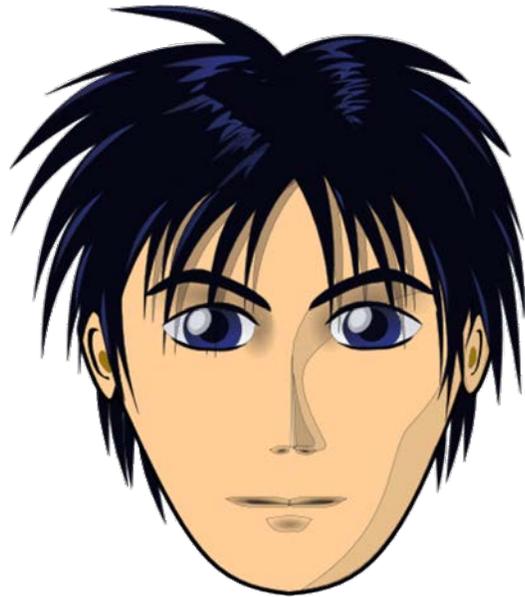
This case stuff really  
made me think. Tim  
said so, too ...



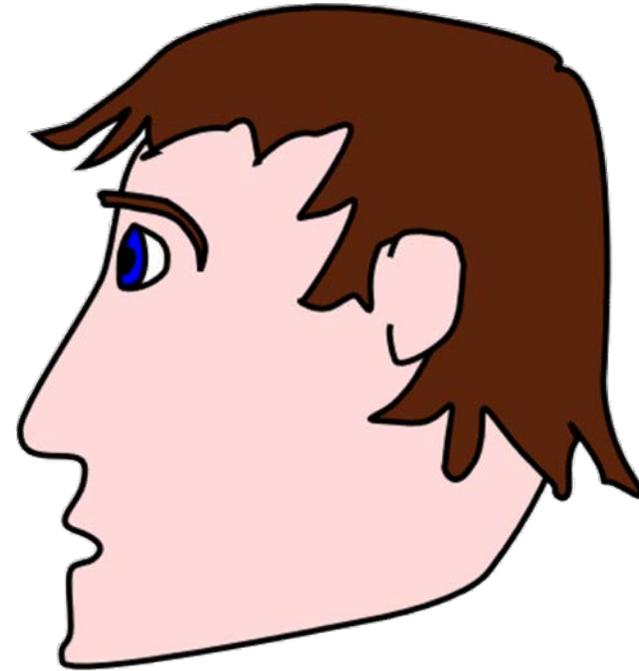
... it seems like such a great idea. Why don't more people use it?



... it seems like such a great idea. Why don't more people use it?



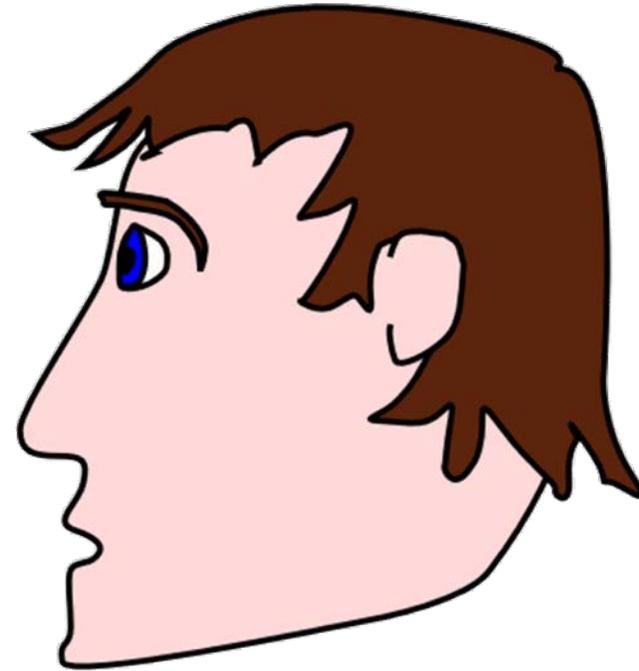
Well ...  
That's a hard question ...



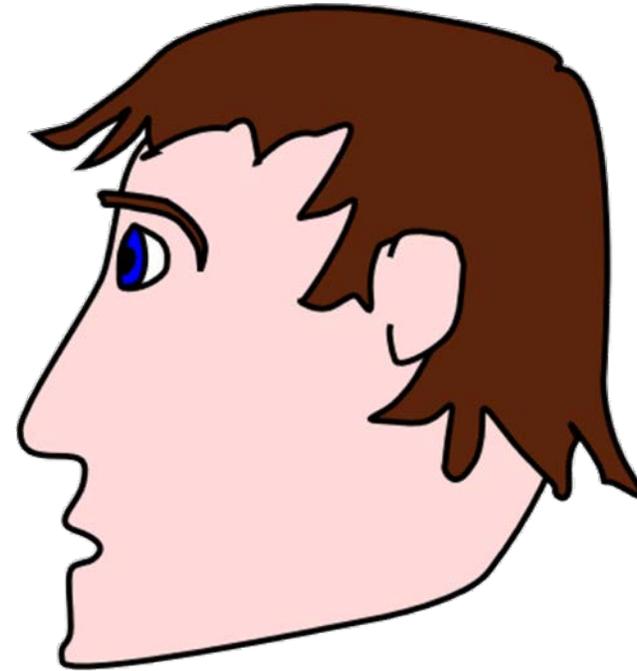
... it seems like such a great idea. Why don't more people use it?



... with lots of different parts to the answer.



Like what,  
for instance?

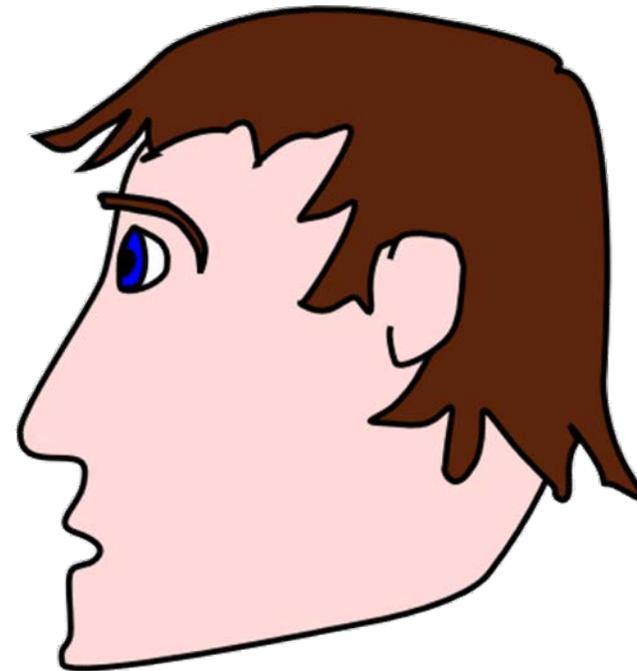


Like what,  
for instance?



Lack of  
understanding  
of  
argumentation

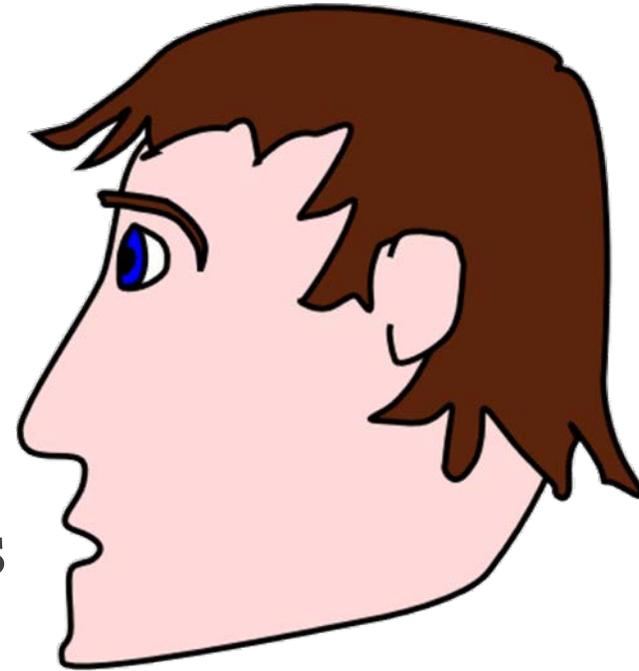
...



Like what,  
for instance?



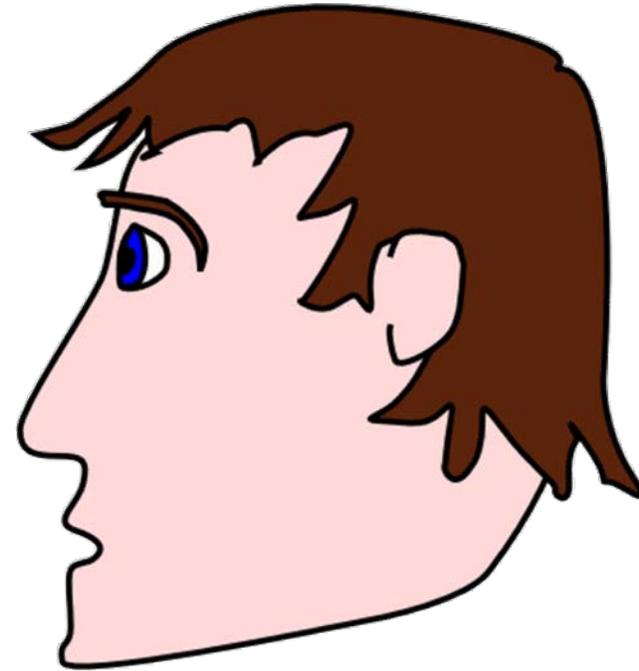
... thinking it is  
harder than it  
is ...



Like what,  
for instance?



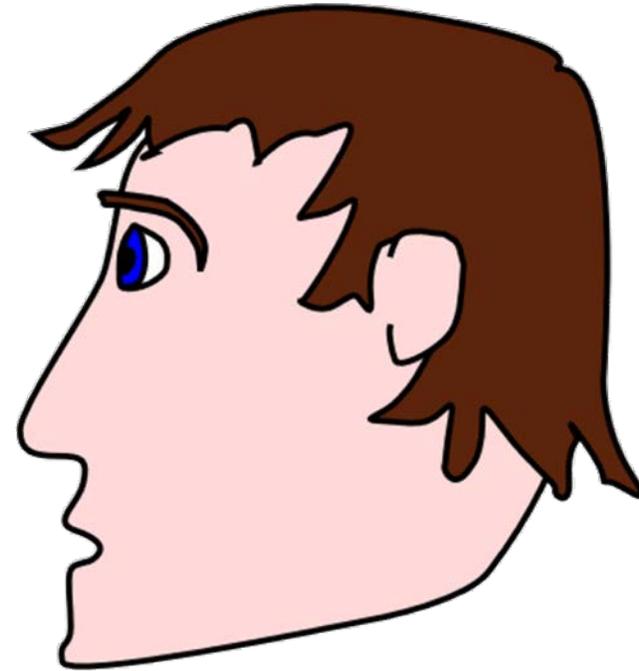
... or thinking  
it adds nothing  
to what's  
usually done ...



Like what,  
for instance?



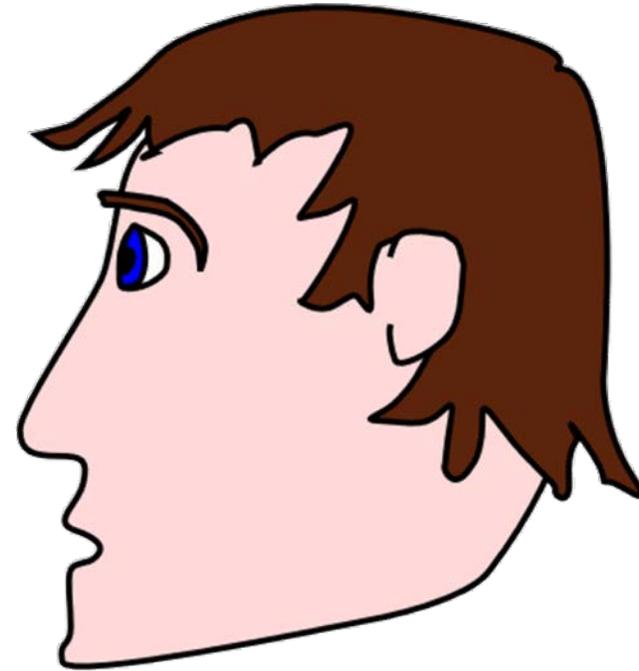
... (which is  
some times  
true) ...



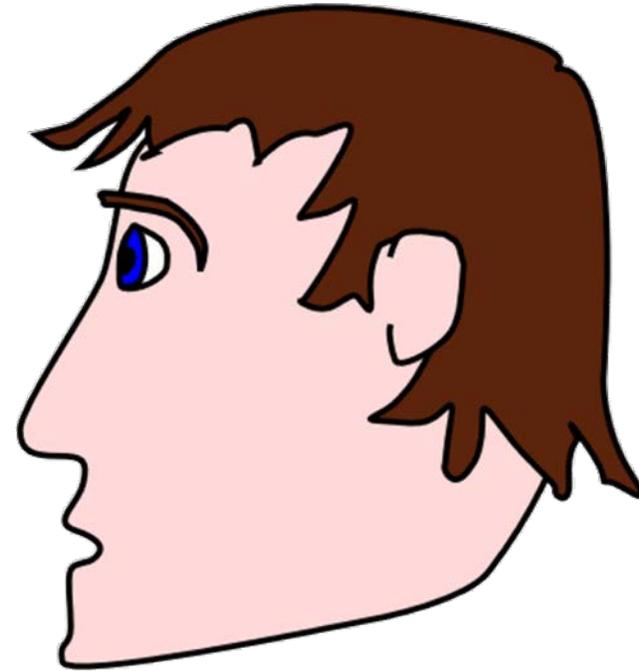
Like what,  
for instance?



... or even just  
believing  
uninformed  
rants from  
so-called  
experts.



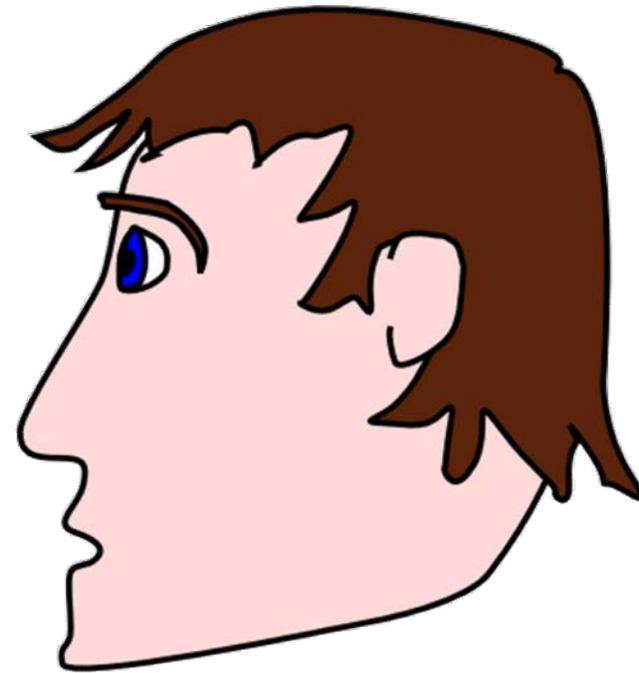
Sounds confusing.  
Will the problems  
get fixed?



Sounds confusing.  
Will the problems  
get fixed?



Don't know if  
it ever will ...

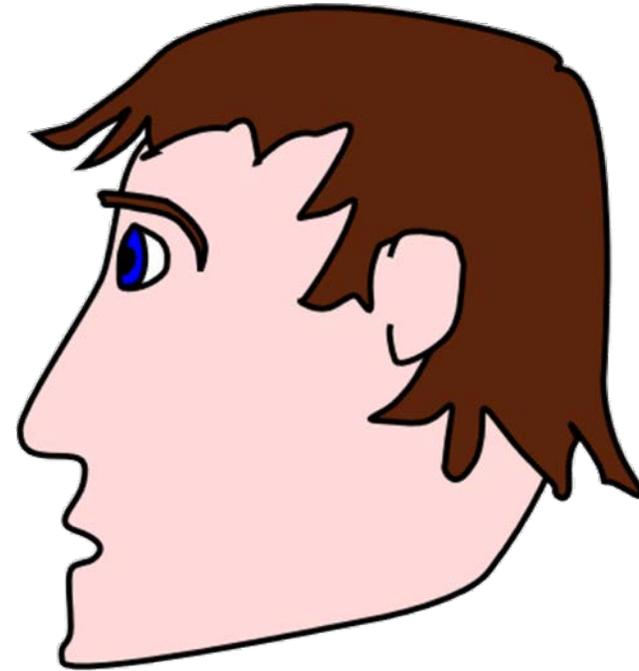


Sounds confusing.  
Will the problems  
get fixed?



... because  
no one really  
knows how

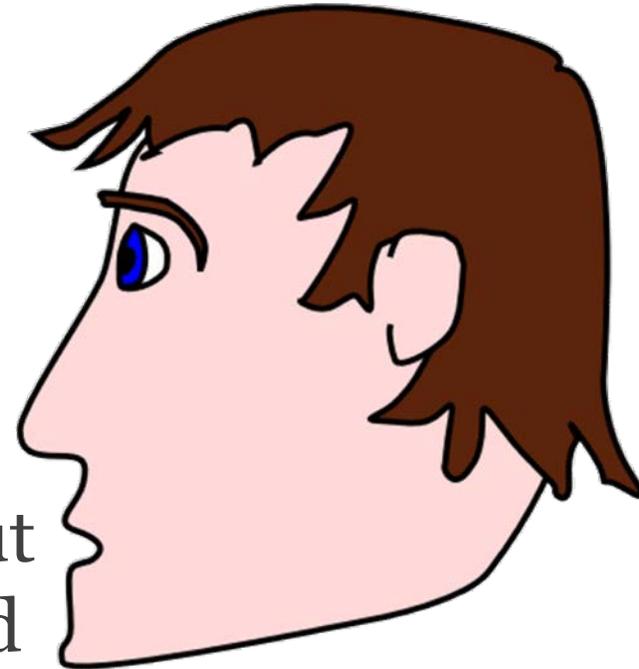
...



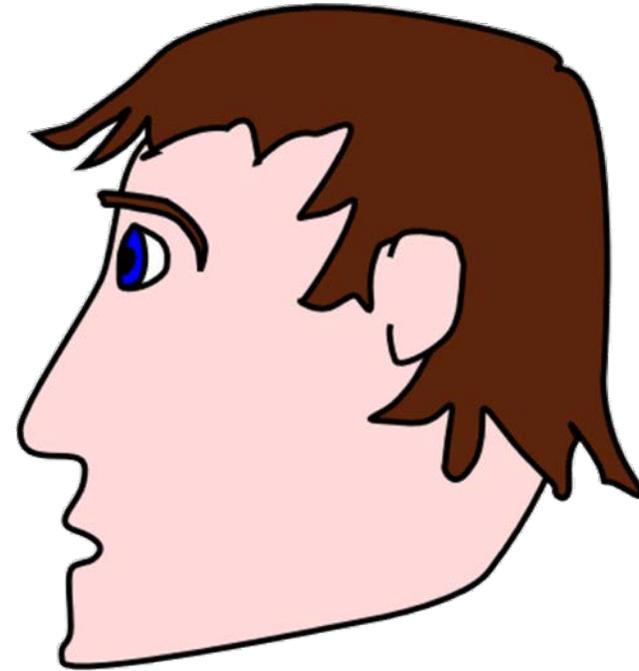
Sounds confusing.  
Will the problems  
get fixed?



... to figure out  
if one method  
is better than  
another one.



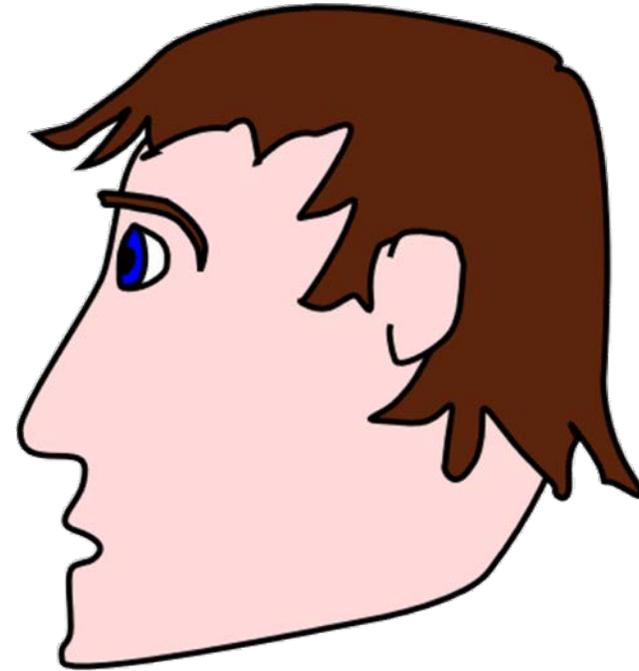
Better get going  
on my homework  
now.



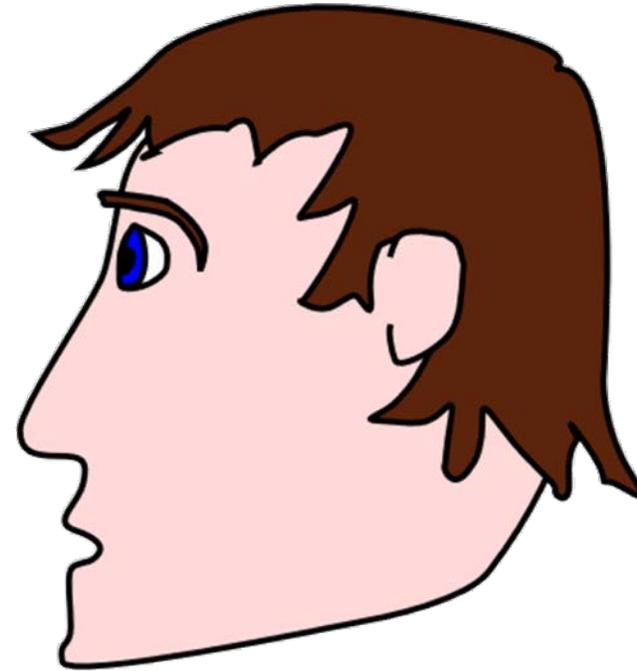
Better get going  
on my homework  
now.



What is it?



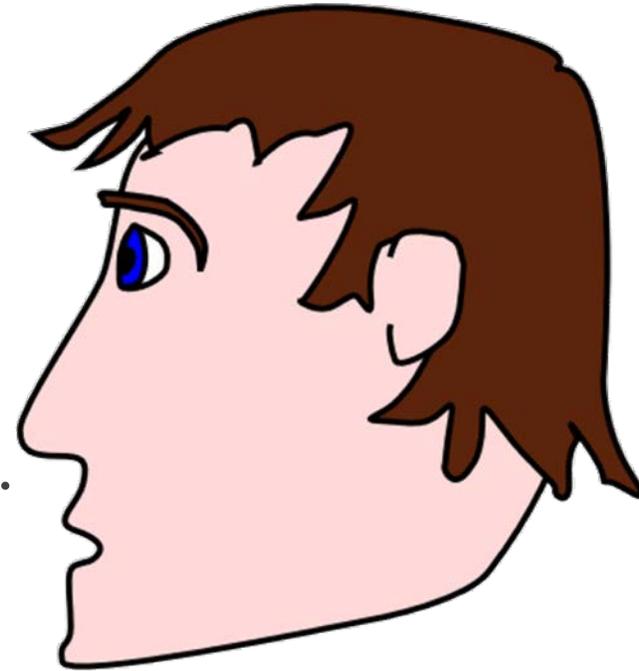
Reading two  
essays in  
*Studies in Pessimism*



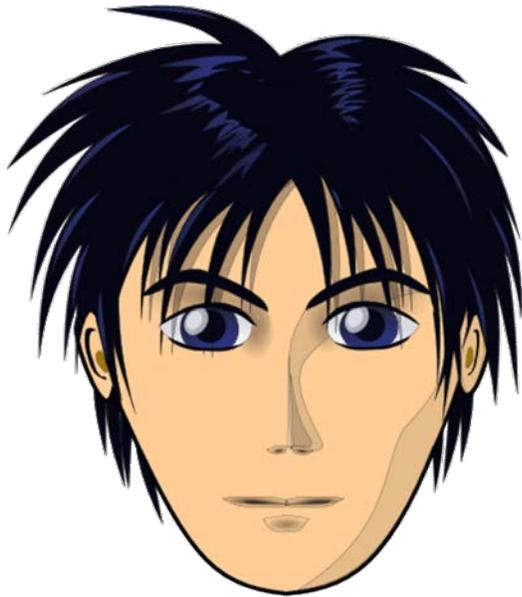
Reading two  
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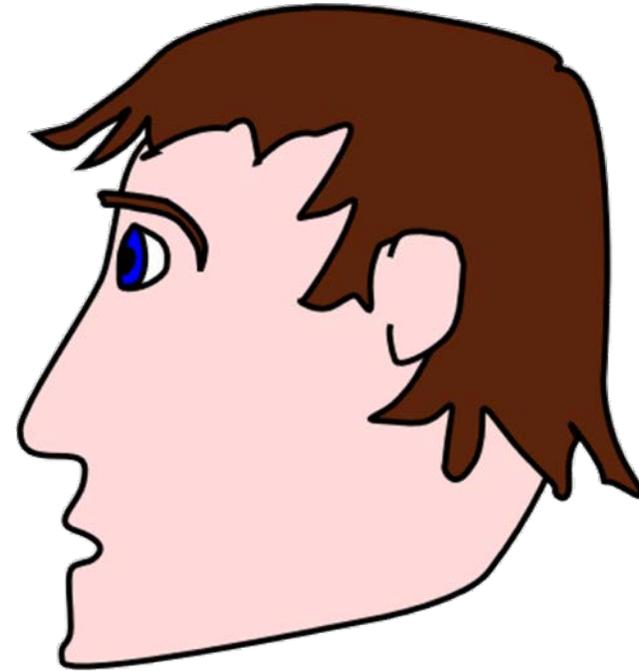
Never read it. ...



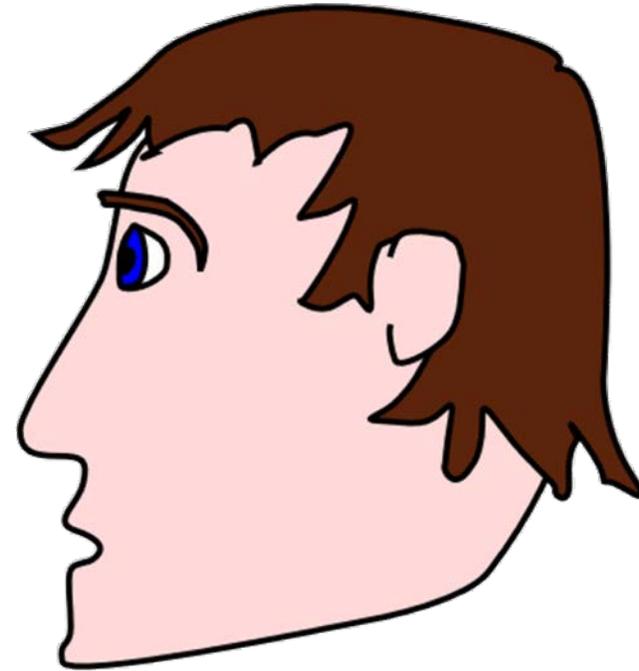
Reading two  
essays in  
*Studies in Pessimism*



Sounds like  
something I  
could've written,  
'though.



Yes. ...  
Yes, it does.



# *Answers to our original questions ...*

*Does Tim have an assurance case?*

*Yes. Yes, he does.*

# Tim's assurance case

We argue Tim is a *safe enough* driver to take Jon to the game by showing five independent sources of support for Tim's ability to drive safely. These sources are (1) Tim has satisfied all legal requirements for driving; (2) Tim has not been in an accident; (3) nothing untoward is going on in Tim's life that might cause him to drive less well than usual; (4) Tim has a good reputation for driving; and (5) Tim's car does not pose any *special danger*. We assume that Tim will be the driver and Jon the only passenger.

## Premises:

- Tim has a good reputation for driving (A-2)
  - Safe Driver *X* believes Tim is a safe driver (A-1)
- Tim's car does not pose any *special danger* (A-3)
- Tim has not been in an accident (A-4)
- Tim has satisfied all legal requirements for driving (A-5)
- Nothing untoward is going on in Tim's life (A-10)
  - Tim is not currently in any fights (A-8)
  - Tim's academic life will not affect his driving (A-7)
    - Tim consistently gets *good grades* (A-6)
  - Tim has no big life decision that may distract him (A-9)

# (continued)

*X represents the number of safe drivers attesting to Tim's safeness.*

## **Safe Driver *X* believes Tim is a safe driver (A-1)**

The argument for Safe Driver *X* actually being a safe driver is found in <reference>. Through the statement provided by Safe Driver *X* regarding Tim's driving, we conclude Safe Driver *X* believes Tim is a safe driver.

## **Tim has a good reputation for safe driving (A-2)**

We assume a safe driver will not say that someone is a safe driver without adequate evidence. By the testimony of the known safe drivers seen in A-1, we conclude Tim has a good reputation for safe driving.

## **Tim's car does not pose any *special danger* (A-3)**

Based on evidence to be provided at a later date, we conclude Tim's car does not pose any *special danger*.

# *(continued)*

## **Tim has not been in an accident (A-4)**

Based on common knowledge, DMV records, and insurance records, we conclude Tim has not been in an accident.

## **Tim has satisfied all legal requirements for driving (A-5)**

Given that Tim has a driver's license, which appears to be genuine we conclude Tim has satisfied all legal requirements for driving.

## **Tim consistently gets *good grades* (A-6)**

Based on Tim's transcript, we conclude Tim consistently gets *good grades*.

## **Tim's academic life will not affect his driving (A-7)**

By the argument A-6, we conclude Tim's academic life will not affect his driving.

## **Tim is not currently in any fights (A-8)**

Based on common knowledge and testimony of friends and family, we conclude Tim is not currently in any fights, disagreements, or arguments with friends or classmates.

## **Tim has no big life decision that may distract him (A-9)**

Based on testimony from friends and family, we conclude Tim has no big life decisions that may distract him.

# (continued)

## **Nothing untoward is going on in Tim's life (A-10)**

Only two of these three arguments need to be shown true for the sub-conclusion, nothing untoward is going on in Tim's life, to be true. *Jon's dad was not satisfied by 2 of 3 and insisted on all three.*

### **Argument One:**

By showing Tim is happy and healthy in his personal life based on the argument in A-7, we conclude nothing is going on in Tim's life that may cause him to drive less well than usual.

### **OR Argument Two:**

By showing Tim is happy and healthy in his personal life based on the argument in A-8, we conclude nothing is going on in Tim's life that may cause him to drive less well than usual.

### **OR Argument Three:**

By showing Tim is happy and healthy in his personal life based on the argument in A-9, we conclude nothing is going on in Tim's life that may cause him to drive less well than usual.

# (continued)

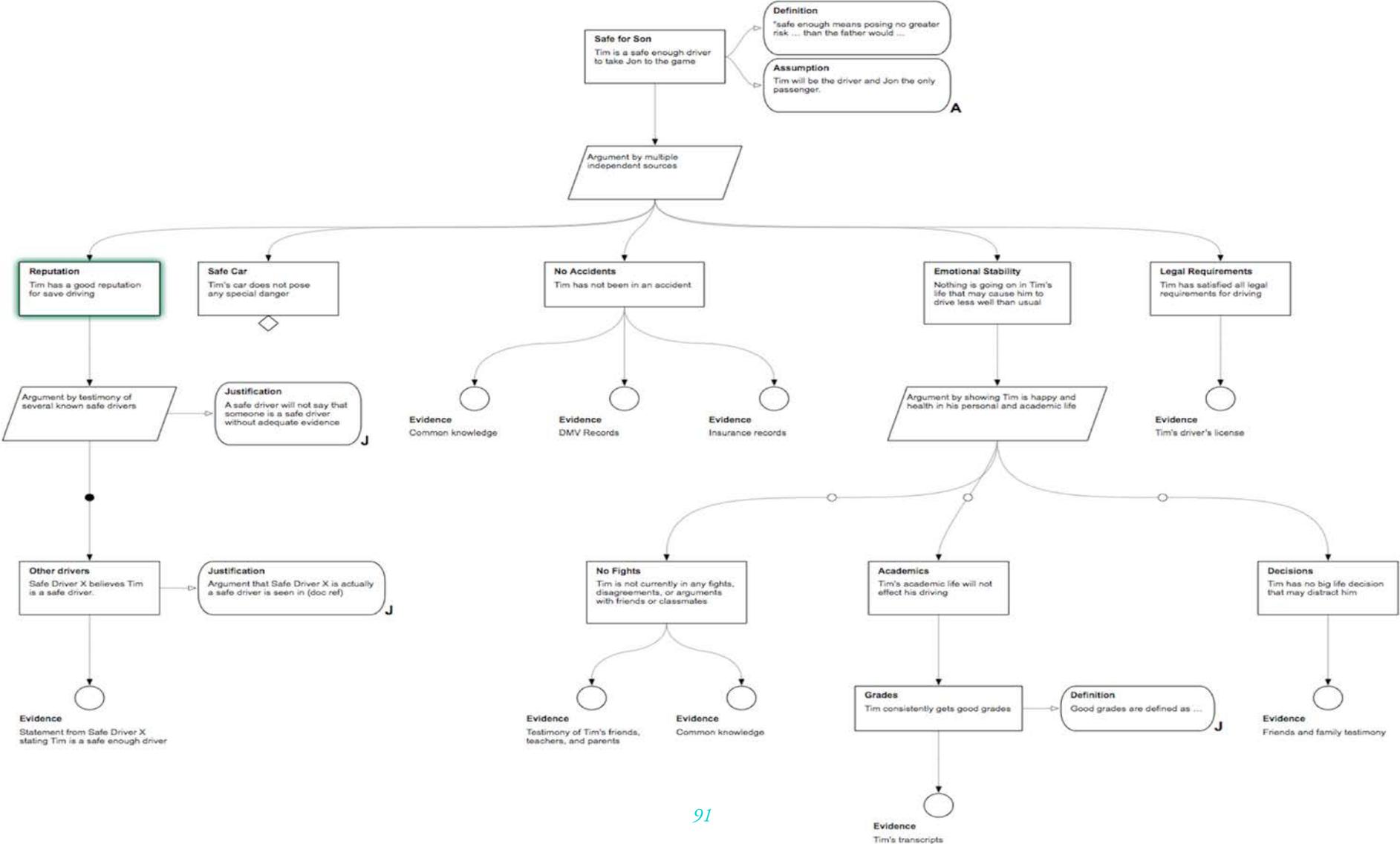
Tim is a *safe enough* driver (A-11)

Using multiple independent sources of support justified by arguments A-2, A-3, A-4, A-5, and A-10, we conclude Tim is a *safe enough* driver to take Jon to the basketball game.

## Glossary

- *safe enough*: at least as safe as Jon's dad
- *special danger*: a problem safe driving cannot overcome
- *good grades*: at least a B+ average

# GSN version



*... will Jon's dad let him ride with Tim?*

*Yes.*

*Who's playing in the game?*

*Garden View High School (Jon's school)*

*v.*

*Catronville High (GVHS' rival).*

*What sport are they playing?*  
*Basketball.*

*Who will win the game?*

*Sadly, Catronville.*

*(Happily, in just four months, GVHS will defeat CHS in an epic battle for the state championship in baseball.*

*Jon will drive in the winning run.)*

*Will Jon get home safely?*

*Yes, without incident.*

*What about Naomi?*

*Her dad wouldn't let her go to the game.*