ADVANCED ANALYTIC RIGOUR

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- **Open up the discussion more**

- **Short examples and rabbit holes**

  - **Great to know how to improve those so they better illustrate the intended point, but probably shouldn't spend so much time on them.**

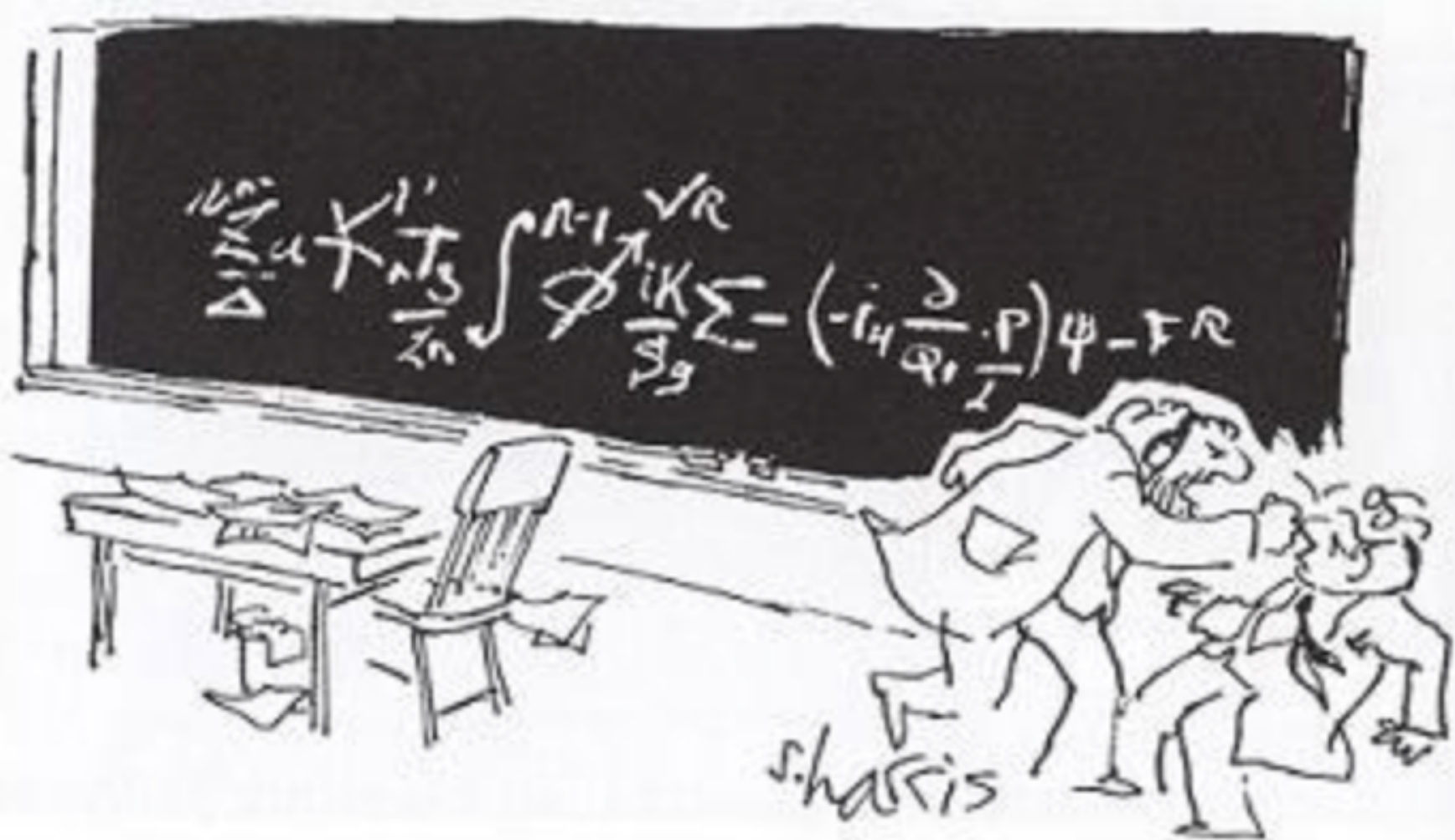 - **Might be better to move on and try another example as we always have plenty in reserve.**

1. RST Recap

2. Practice (with a focus on fixing flaws)

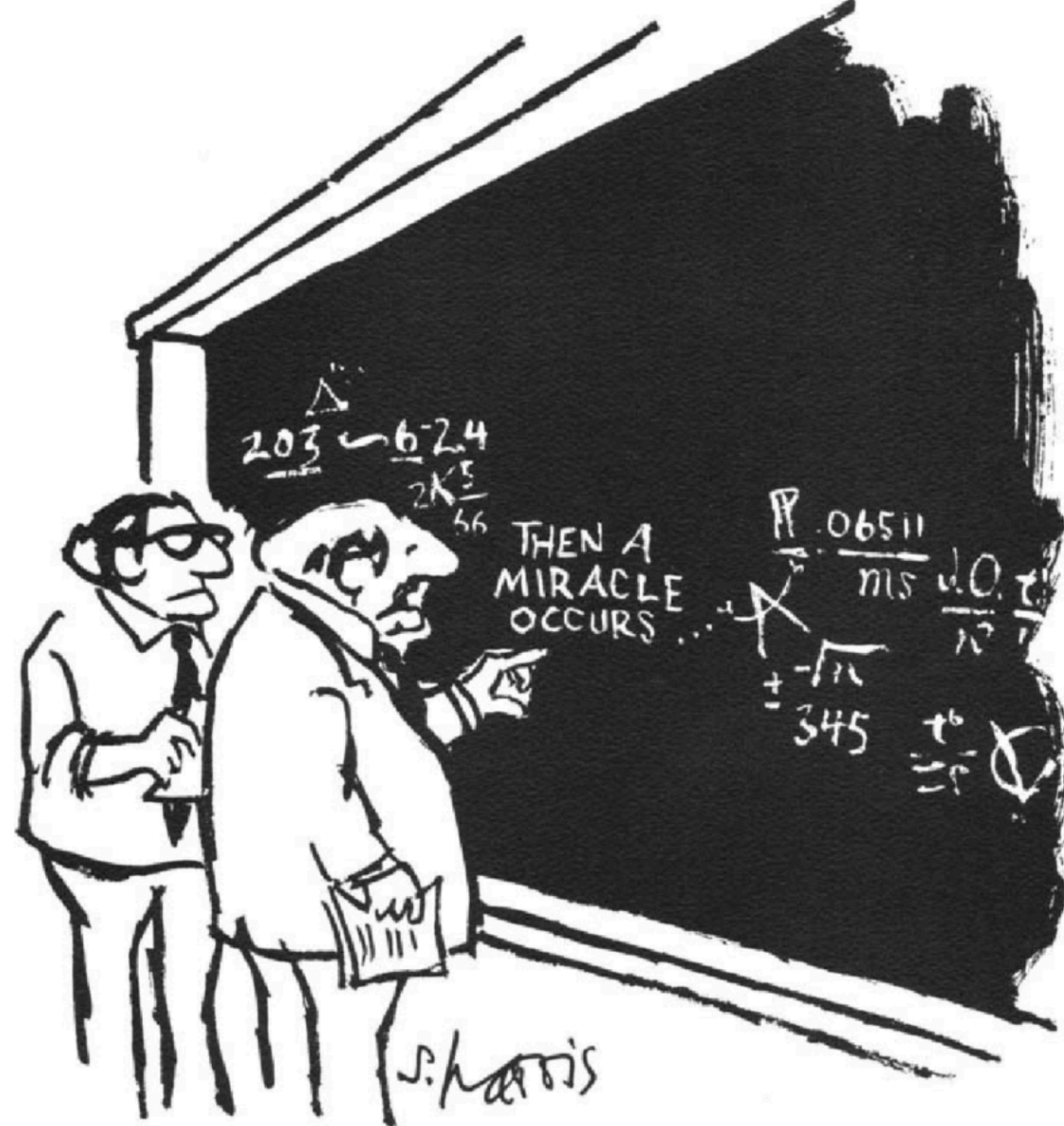3. Apply the method to our own reasoning

1. RST Recap

"YOU WANT PROOF? I'LL GIVE YOU PROOF!"

RST – an efficient and simple method

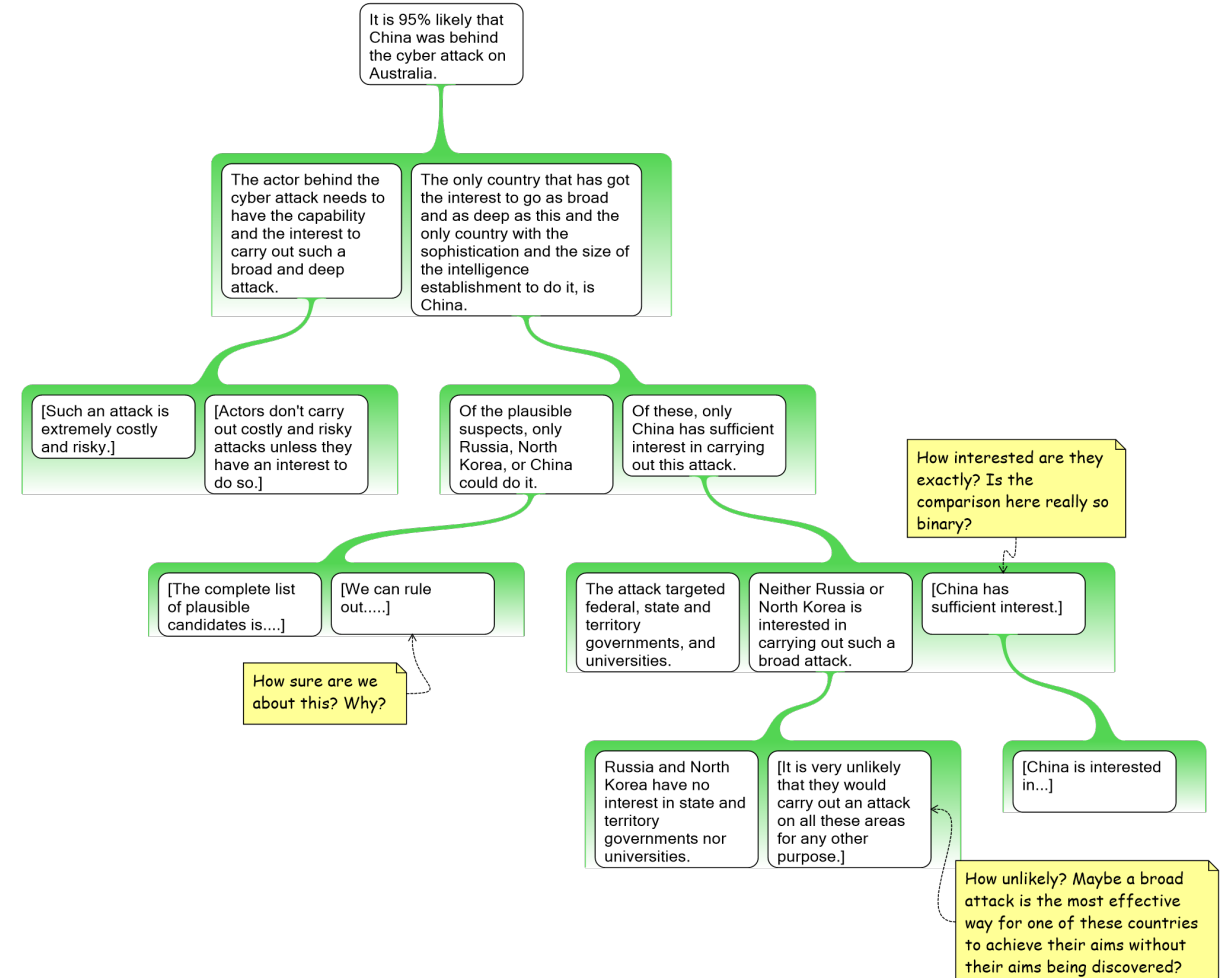"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."

- Avoid common mistakes of evaluation, such as being too

  - Abstract

  - Laborious

  - Rigid

1. Review Reasoning

2. Identify Flaws

3. Assess Impact

4. Fix Flaws

Pointing out possible flaws in an attempt to break the argument

- What is the conclusion/assessment?

  - State it as precisely as possible, including the uncertainty assigned to it.

  - For example, don't say,

    - **"Terrorist group X is planning an attack"**

  - if the author is really arguing that,

    - **"It is highly likely that terrorist group X is planning an attack against target Y to occur within the next 6 months."**

1. Review Reasoning

- How does the reasoning try to establish the conclusion?

  - What is the structure of the argument?

    - What are the steps involved.

      - This is often difficult because people often don't bother to structure the information they present.

    - Don't get distracted, focus on the core moves in the argument.

  - What is the logical connection between the conclusion and the evidence or supporting information.
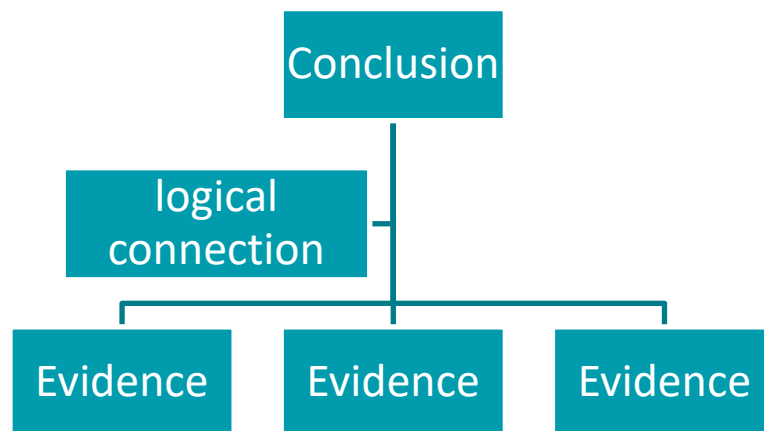
Types of evidence or information

	Comparing explanations	Predictive indicators	Causal indicators	Case studies	Analogy	Sources	Data	Criteria	Logical consistency
Explanation (X explains Y)	E.g. IBE								
Causal (X caused Y)									
Generalisation (All X are Y)									
Categorisation (This X is a Y)			Types of Justifications or logical connections						
Forecast (X will happen at time Y)									
Comparison (X is greater than Y)									
Conditional (X if Y)									

Types of conclusions

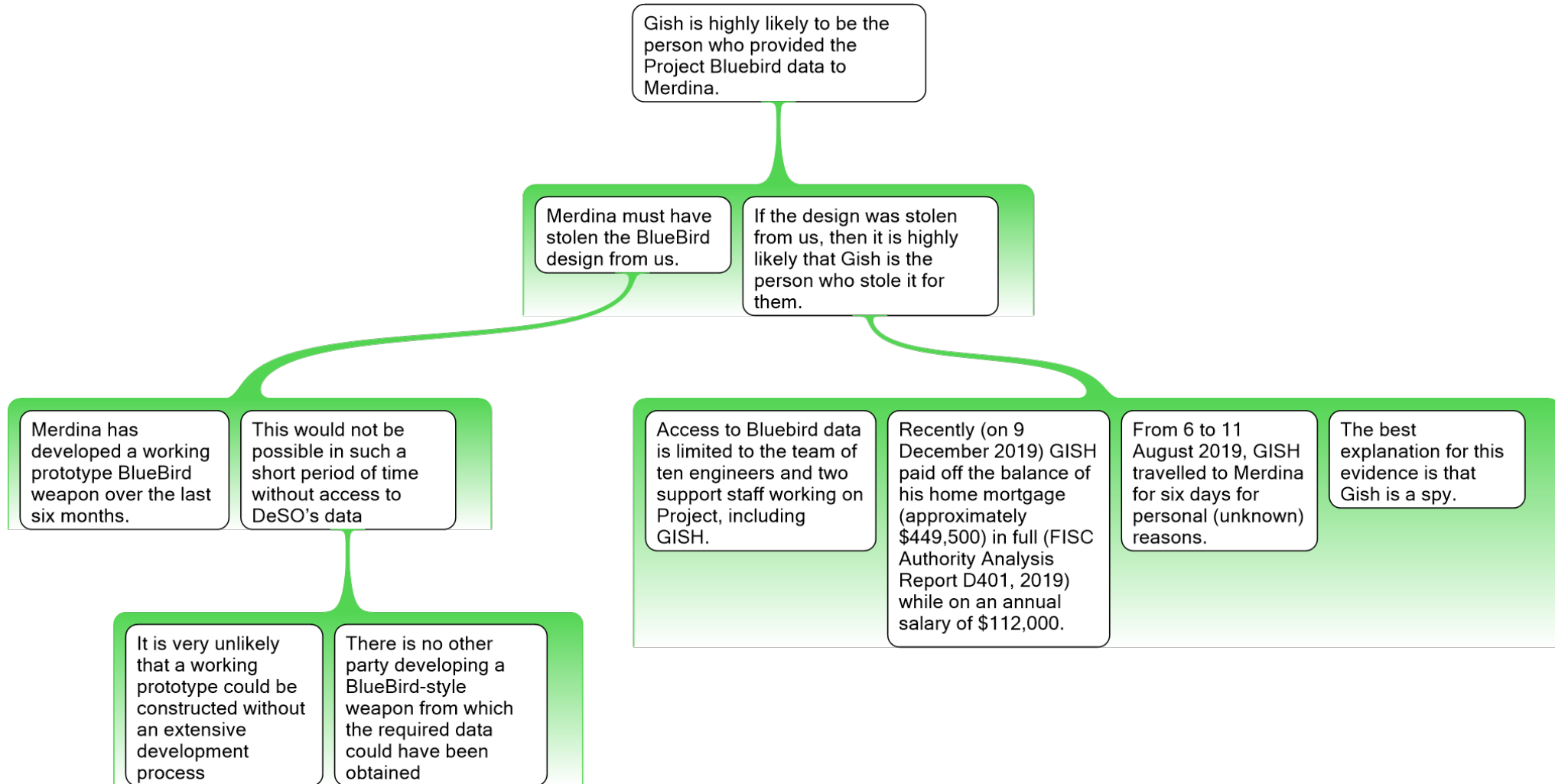| 1: Review Reasoning	
Main conclusion:	
Summarise the main steps or parts of the argument:	Type of reasoning:

Jordan GISH investigation report

Jordan GISH is a 65-year-old engineer working in the Defense Science Organization (DeSO) on Project BlueBird, which focuses on the development of new weaponry. We have reason to believe that GISH has been engaged in espionage, and more specifically has been assisting the Merdina government to build comparable weapons (DeSO Bluebird Investigation Report, 2019). Our country has had tense relations with Merdina for the last decade.

- Recent intelligence shows that Merdina has developed a working prototype BlueBird weapon over the last six months (Merdina Weapons Development Report, 2019). Our in-house subject matter experts agree that this would not be possible in such a short period of time without access to DeSO's data. Their assessment considers that (i) it is very unlikely that a working prototype could be constructed without an extensive development process, and (ii) there is no other party developing a BlueBird-style weapon from which the required data could have been obtained (DeSO Bluebird Investigation Report, 2019).

- Access to Bluebird data is limited to the team of ten engineers and two support staff working on Project, including GISH.

- Recently (on 9 December 2019) GISH paid off the balance of his home mortgage (approximately $449,500) in full (FISC Authority Analysis Report D401, 2019) while on an annual salary of $112,000.

- From 6 to 11 August 2019, GISH travelled to Merdina for six days for personal (unknown) reasons.

The best explanation for this evidence is that Gish is a spy. Therefore, we conclude that GISH is highly likely to be the person who provided the Project Bluebird data to Merdina.

1. Review Reasoning

Gish is highly likely to be the person who provided the Project Bluebird data to Merdina.

Merdina must have stolen the BlueBird design from us.

If the design was stolen from us, then it is highly likely that Gish is the person who stole it for them.

Merdina has developed a working prototype BlueBird weapon over the last six months.

This would not be possible in such a short period of time without access to DeSO's data

Access to Bluebird data is limited to the team of ten engineers and two support staff working on Project, including GISH.

Recently (on 9 December 2019) GISH paid off the balance of his home mortgage (approximately $449,500) in full (FISC Authority Analysis Report D401, 2019) while on an annual salary of $112,000.

From 6 to 11 August 2019, GISH travelled to Merdina for six days for personal (unknown) reasons.

The best explanation for this evidence is that Gish is a spy.

It is very unlikely that a working prototype could be constructed without an extensive development process

There is no other party developing a BlueBird-style weapon from which the required data could have been obtained

| 1: Review Reasoning	
Main conclusion: GISH is highly likely to be the person who provided the Project Bluebird data to Merdina.	
Summarise the main steps or parts of the argument: Reasoning has two main parts. First it states that Merdina stole the Project Bluebird data, based on the previous analysis by in house experts. Second it claims that Gish is the most likely culprit because of his recent spending and a trip he took to Merdina.	Type of reasoning: Source (appeal to expert) Inference to best explanation.

- What are the most important reasoning flaws in the text?

  - What the reasoning needs to do to successful establish the conclusion, and does it falls short in any way.
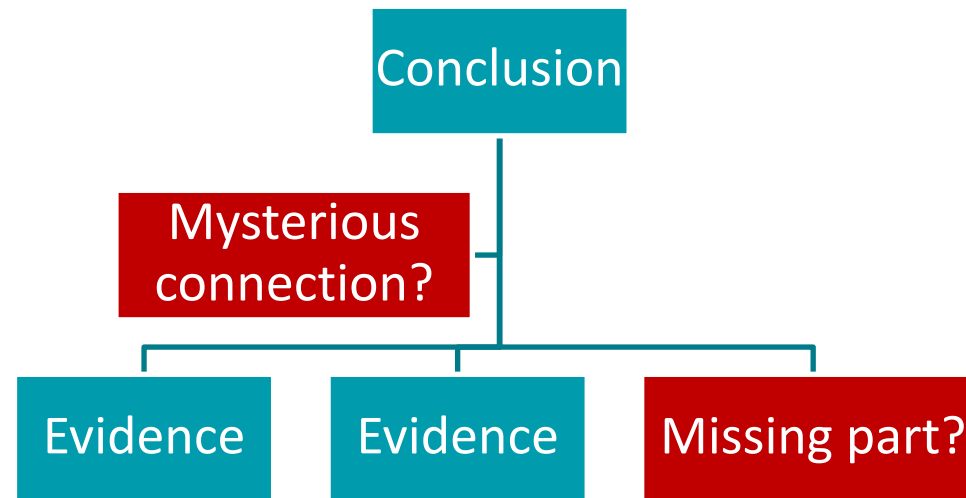
2. Identify Flaws

- Use the flaw taxonomy to help

  - Is it hard to identify a clear argument?

    - Check **Primary Judgements.**

  - Does the argument use a reasoning stratagem poorly?

    - Check the relevant category to do with **Sources, Causal or Explanatory reasoning, Probability and Statistics, Predictions, or Evidence** such as case studies and examples.

  - Is there a more general problem with the logical consistency of the argument?

    - Check **Logic, Assumptions, Uncertainty**

- If there are several ways of describing the flaw pick the most precise or useful description. (The one that would most help the person fix it.)

☰ Reasoning Flaws

Select a category or use the search box to filter the list of flaws.

Flaws

| All Flaws | Primary Judgments | Sources | Causal/Explanatory |

| Prob/Stats | Predictions | Evidence | Logic | Assumptions | Uncertainty |

| search by keyword | search |

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Flaw Name ⬇	
A correlation is assumed to be a causal relationship	view
An assumption is false or implausible	view
An assumption requires justification	view
Base rate information is ignored or misused	view
Data fishing or cherry-picking	view
Failing to consider counterfactuals	view
Failing to see the implications of information when combined	view
False dilemma	view
Generalising from a biased sample	view
Ignoring plausible alternative explanations or hypotheses	view

2: Identify Flaws			
	Flaw 1	Flaw 2	Flaw 3
Flaw Specify a reasoning flaw from the taxonomy			
Description Describe where and how the flaw occurs in the reasoning			

2: Identify Flaws

	Flaw 1	Flaw 2	Flaw 3
Flaw Specify a reasoning flaw from the taxonomy	Ignoring plausible alternative explanations or hypotheses		
Description Describe where and how the flaw occurs in the reasoning	There could be alternative explanations for Gish's recent wealth, so the inference that his wealth shows that he is the spy is flawed. For example, perhaps he has inherited some money from relatives. The report should have explicitly identified the source or stated why no other explanation for his recent wealth is plausible. Gish's trip to Merdina could have been an innocent holiday, or could have had another purpose unrelated to spying.		

- Prioritize Flaws

  - Best to fix the flaws that will involve the most serious revision first

  - Too much feedback can be counterproductive

  - Quality feedback over quantity

- Watch out for false alarms!

"Not bad, fellas. Let's do one more take, with more emphasis on tone, harmony, melody, rhythm, composition, lyrics, musicianship, tempo, and originality."

- Does the flaw weaken the argument?

- In other words:

  - Does the flaw prevent the reasoning from establishing the conclusion as stated?

  - Does the flaw mean that reasoning doesn't imply the level of certainty the author attributes to the conclusion?

  - Does the flaw undermine the support the author intends the argument to provide to the conclusion?

- E.g., If the conclusion is **"It is 90% likely that X"**, but the flaw means it should say **70%**, then that is a serious flaws

- E.g., If the conclusion is **"X is true come what may"**, but the flaw means that it should say **"X will happen if Y does"** then that is a serious flaw

3: Evaluate Impact			
Impact Assess the flaw's impact			

3: Evaluate Impact			
Impact Assess the flaw's impact	We have no reason to think that the explanation that Gish is the spy is any more likely than the alternative explanations. Crucially, there are 11 other suspects who should be investigated for potential spying, and it is possible that there is stronger evidence pointing to the involvement of one of Gish's colleagues, and that there is additional evidence about his colleagues that would decrease the likelihood of his guilt. Thus, the flaw is fatal, and the reasoning as it stands provides no support for the conclusion.		

4. Fix Flaws

- What is the best way to fix the flaws?

  - Change the reason, the conclusion, or both?

    - If you are changing the reasoning, what part of the argument should be changed?

  - Do you currently have sufficient information to fix the flaw in question?

    - If so, suggest the required fix

    - If not, make recommendations as to what the author needs to determine, find out or consider ahead of fixing the flaw

- E.g., "This argument argues that X is the best explanation for Y. For this argument to establish the conclusion it needs to compare X with the other possible explanations and show how it is more plausible. Unfortunately, it fails to consider the alternative explanation X', and so doesn't convincingly establish the conclusion."

4: Fix Flaws

Fixes/recommendations Suggest how best to fix the flaw or, if this isn't possible, make recommendations for what needs to happen ahead of fixing the flaw			

4: Fix Flaws

| Fixes/recommendations Suggest how best to fix the flaw or, if this isn't possible, make recommendations for what needs to happen ahead of fixing the flaw | This reasoning cannot be improved with the existing information with the report. Would need to examine the other people who had access to the Project Bluebird data, and compare who is most likely to be the spy. | | |