The following materials are adapted from Tan, C. (2007). Critical thinking skills: Identifying, analysing and evaluating arguments. IN Tan, C. (ED.), Engaging Films and Music Videos in Critical Thinking (PP. 3-44). Singapore: McGraw-Hill.

Section 1: Identifying and Analysing Arguments

An argument is a set of claims that represent some ideas about the way the world is or should be. An argument consists of a **conclusion** and **premise(s)** which support(s) the conclusion. The conclusion is the claim that the arguer is trying to establish. A premise is the reason that is used to support the conclusion. The step in reasoning from the premise(s) to the conclusion is known as inference.

How does one identify the premises and the conclusion? One way is to look for words or indicators in the argument that signal to you what the claim is about. For premises, indicators such as "because", "since", "for" and "it follows that" signal that the claim is likely to be a reason to support the conclusion. On the other hand, common conclusion indicators are "therefore", "so", "hence", "consequently" and "it follows that".

An **assumption** is a claim that is not explicitly mentioned but is implied by the arguer. Since it is an implied premise, it needs to be clearly listed as a part of the argument.

Checklist to identify key assumptions (Browne & Keeley, 2010; Pherson & Pherson, 2013):

- How do you get from the reason to the conclusion?
- What are the 5 Ws (Who, What, When, Why) and 1 H (How)?
- If the reason is true, what else must be true for the conclusion to follow?
- Supposing the reason(s) were true, is there any way in which the conclusion nevertheless could be false?

It is important to understand the type of claim that is made in a premise. There are two main types: **factual claim** or **value claim**. A factual claim is a claim about some facts in the world while a value claim is a claim about one's value judgement about something.

It is also important to understand the type of premise given – whether it is a **dependent** or **independent** premise. A dependent premise is a premise that cannot stand on its own but needs another premise to support it. In contrast, an independent premise is a premise that stands on its own.

The conclusion of an argument can either be explicit or implicit. An explicit conclusion is one where it is clearly mentioned by the arguer. It is therefore easy to know what the arguer is claiming. On the other hand, an implicit conclusion is one where the arguer makes a claim indirectly. It is important for the audience to identify the conclusion so as to understand what the arguer is claiming.

An argument can have only one conclusion or more than one conclusion. If there is only one conclusion in an argument, then the argument is a simple argument. If there is more than one

conclusion, then the argument has at least one intermediate conclusion leading to a final conclusion. If there is more than one conclusion in an argument (i.e., with intermediate and final conclusions), then the argument is a complex argument.

Types of Arguments: Deductive and Inductive

It is also helpful to distinguish two main types of arguments: (1) deductive arguments and (2) inductive arguments. Knowing the type of argument will help us apply the relevant criteria when analysing and evaluating them.

A **deductive argument** is an argument where it is claimed that the premises necessarily lead to the conclusion. In other words, if the premises are true, then the conclusion must be true. In such an argument, the conclusion does not go beyond the facts stated in the premises. Deductive arguments may take many argument forms. Below are some common deductive argument forms. A common deductive argument form is categorical syllogism (note: P stands for 'premise' and C stands for 'conclusion'):

P1: All Xs are Ys.
P2: B is an X.
C: B is a Y.

Another common deductive argument form is modus ponens:

P1: If X, then Y.
P2; X.
C: Y.

Another deductive argument form is distinctive syllogism:

P1: X or Y.
P2:Not X.
C: Y.

The second type of argument is inductive argument. In contrast to a deductive argument, an inductive argument is one where it is claimed that the premises probably lead to the conclusion. In an inductive argument, the conclusion goes beyond the facts stated in the premises.

Like deductive arguments, **inductive arguments** may take many argument forms. Some common forms are mentioned here. One common inductive argument form is statistical syllogism:

P1: Most X are Y.
P2: B is an X.
C: B is a Y.

Another inductive argument form is inductive generalisation:
P: Most Xs are Ys.
C: All Xs are Ys.

Another argument form is case-building argument. This type uses a combination of premises as evidence to make the conclusion plausible. The argument structure is as follows:

P1: A
P2: B
P3: C etc …
C: Z

An **abductive** argument is a type of inductive argument.

Abduction = "It is an inference to a hypothesis on the ground that it best explains one or more other propositions taken to be known or justifiedly believed" (Robert Audi, Epistemology, 2010, p. 260).

Abductive logic = "the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea" (Charles Pierce, 1905, cited in Dunne & Martin, 2006, p. 518).

Abduction is inference to the best possible explanation, ie. It infers a cause from an observed effect.The focus is on the best possible or most likely explanation from the observed phenomenon. The explanation/inferred cause is introduced in the form of a hypothesis.

Section 2: Evaluating Arguments

A **good deductive argument** must fulfil the following two criteria:
(1) all the premises are true/acceptable (Truth/Acceptabillity Criterion) and
(2) all the premises must support the conclusion (Support Criterion).

A **good inductive argument** must fulfil the following three criteria:
(1) all the premises are true/acceptable (Truth/Acceptabillity Criterion) and
(2) all the premises are likely to support the conclusion (Support Criterion) and
(3) all the premises contain all known relevant information (All Known Relevant Information Criterion).

There are a number of similarities between the criteria for deductive and inductive arguments. Notice that the *first criterion* is the same – that the premises must be true or acceptable.

The *second criterion* is also similar – it is about the relationship between the premises and the conclusion. For both types of arguments, the premises must support the conclusion. For a deductive argument, the support must be such that the premises, if true/acceptable, necessarily lead to the conclusion. Put it another way, if the premises are true/acceptable, then the conclusion cannot be false. This is different for inductive arguments. The requirement for an inductive

argument is that the premises should lead to the conclusion being probably true/acceptable. In other words, an inductive argument is inductively strong or forceful if the premises must support the conclusion in such a way that it would be more reasonable than not to expect the conclusion to be true/acceptable. Notice also that there is a third criterion attached to inductive arguments. Since inductive arguments are dependent on probability, this means that the amount of relevant known information one has will directly affect the strength of the argument.

The *third criterion* states that it is important for the premises to contain all known information relevant to the subject-matter of the argument.

From our discussion on the criteria for deductive and inductive arguments, we can identify three questions to help us evaluate different types of arguments:

(A) Are the premises true or acceptable?
(B) Do the premises support the conclusion?
(C) Are there other relevant factors to take into consideration?

The following sections will address the 3 questions accordingly.

(A) Are the premises true or acceptable? The Truth/Acceptability Criterion

The first criterion is whether the premises given are true or acceptable. We usually use the words "true" or "false" when the premise involves factual claims which can be verified. On the other hand, it is preferable to describe a premise as "acceptable" or "not acceptable" when we talk about value claims which rely more on moral values.

For premises to be true or acceptable, they should be supported by evidence. Below are some common types of evidence that could be used to support premises:

• Fact
This refers to certain state of affairs in the world that tells us that the premise is true. Take this example: "Today is a sunny day." We can know if this premise is true or not by simply going outdoors and checking the weather.

• Expertise
This refers to the words of experts. It can be found usually in reliable sources such as academic books, scholarly journals, and interviews with these experts. Take this example: "Boerhaave's glands are the coil glands of the skin that secrete sweat." We can know if this premise is true by reading medicine encyclopedia or consulting a medical doctor.

• Personal Experience
This refers to the sensory experiences of a person based on what he sees, feels, touches, tastes and hears. Take this example: "Ice-cream tastes cold." We can know if this premise is true or not by eating the ice-cream and experiencing for ourselves if the ice-cream is indeed cold.

• Logic
This refers to the use of reasoning to see if the premise makes sense. Take this example: "A bachelor is an unmarried male." We can know if this premise is true by simply reflecting on the meaning of the claim. Once we understand the meaning of the word "bachelor", we can tell that the premise is true.

• Testimony of Others
This refers to the words of another person who has experienced or witnessed something that is relevant to the premise. Testimony is frequently relied upon in criminal investigations. Take this example: "Y shot Z." Another person, X, may come forward and testify that he has witnessed Y shoot Z. The police would need to establish if X is telling the truth. Relevant information includes whether X is functioning normally on that day (e.g. not under the influence of alcohol or drugs), and whether X has a motive in making the claim (e.g. whether X bears a grudge against Y and is likely to frame him).

• Circumstantial Evidence
This refers to the use of relevant evidence to help us establish the truth of a premise. Take this example used earlier about Y shooting Z. Circumstantial evidence could weaken or strengthen this premise. For example, if it is discovered that X's fingerprint, not Y's fingerprint, is found on the gun that was used to shoot Z, this could make the premise "Y shot Z" weaker, and in fact make X a likely killer instead.

• Corroboration from Other Sources
This refers to different types of evidences working together to make a premise acceptable or unacceptable. The more evidence a premise is supported by - facts, words of experts, personal experience, logic, testimony of others and circumstantial evidence – the more acceptable the premise is.

(B) Do the premises support the conclusion? The Support Criterion

While the previous criterion is concerned with the content of the premises - whether they are true or acceptable - this criterion is concerned with the relationship between the premises and the conclusion. It is not enough to have true premises for an argument to be convincing. This is because it is possible for an argument to consist of all true/acceptable premises, but the premises are not relevant or do not support the conclusion. This criterion states that the premises must be linked to the conclusion in such a way that if the premises are true/acceptable, then the conclusion must be true/acceptable (for deductive arguments) or likely to be true/acceptable (for inductive arguments).

Whether the conclusion is necessarily or probably true depends on the type of argument. As mentioned earlier, a deductive argument is one where it is claimed that if the premises are true, the conclusion must be true. A deductive argument that fulfils the Support Criterion is known as a valid argument. A deductive argument that fulfils both the Truth/Acceptability Criterion and the Support Criterion is known as a sound argument.
On the other hand, an inductive argument is one where it is claimed that if the premises are true, then it is probable that the conclusion is true. An inductive argument that fulfils the Support

Criterion is known as an inductively strong argument. An inductive argument that fulfils both the Truth/Acceptability Criterion and the Support Criterion is known as a cogent argument.

(C) Are there other known relevant factors to take into consideration? The All Known

Relevant Information Criterion

The All Known Relevant Information Criterion applies only to inductive arguments. As mentioned earlier, inductive arguments are based on probability – the more known relevant information one has about the subject-matter of the argument, the higher the probability. A relevant piece of information that is left out may drastically change the probability of an inductive argument. This criterion does not apply to deductive arguments as deductive arguments do not depend on probability. For deductive arguments, either the premises lead to the conclusion (i.e., 100%), or not at all (i.e., 0%).

Checklist to evaluate arguments:

(1) *What type of argument is this?*
- Key question: Is the arguer claiming that if the premises are true, the conclusion must be true (deductive) or only that the conclusion is probably true (inductive)?
- If in doubt, assume that it is inductive, based on the principle of charity (i.e., seek to understand the argument without bias).

(2) Are the premises true?
- Key question: Which theory of truth is used here? What type(s) of evidence and justification are relevant to help us to establish the truth?
- Refer to Theory of Knowledge (TOK) on the different theories of truth, types of evidence and types of justification.

(3) To what extent do the premises support the conclusion?
- Key question: Is it possible for the premises to be true and the conclusion false?
- If it is not possible (i.e., if the premises are true, the conclusion must be true): valid
- If it is possible but unlikely (i.e., if the premises are true, the conclusion is probably true): strong

Section 3: Fallacies

A fallacy is any error in reasoning. Fallacies could either be formal or informal. A formal fallacy is one where there is an error in the relationship between the premises and the conclusion. The premises provide little or no support for the conclusion. On the other hand, an informal fallacy is one where there is an error in the content of the arguments. There are many fallacies and this chapter will highlight some common types of fallacies from films and music videos.

Formal Fallacies

Affirming the Consequent

This fallacy has the following pattern:

If A, then B
B

A

An example is from the film "Salem Witch Trials" about a witch hunt over a ten-month period in Salem, America which ended with 19 people being accused, tried and put to death. During one of the trials for an accused woman, an observer accused her of being a witch and pointed out that she looked stoic and did not cry. It is possible to construct this argument:
"Witness not cry. Compatible with the witches' inability to shed tear."

The argument is follows:

P1: If the witness is a witch, then she is unable to cry.
P2: She is unable to cry.
C: She is a witch.

This is a fallacy as just because she is unable to cry does not mean that she is a witch. There are many reasons why a person chooses not to cry when under trial – it may be that she is not prone to crying, or that she wants to appear strong to defend herself against the charge of witchcraft.
Denying the Antecendent

If A, then B
-A

-B
An example is from the film "Mean Girls". It is about a girl Cady (acted by Lindsay Lohan) who was brought up in Africa and suddenly had to join a public high school in America for the first time. She met the school's most fashionable clique, three girls known as The Plastics. They are the school's coolest and sexiest clique and anyone who is not part of that clique is not considered cool and fashionable. Initially Cady was not part of The Plastics and she was perceived as dowdy

and not cool. Soon Cady abandoned her simple ways and joined The Plastics, dressing, thinking and talking like them. A possible argument is this:

P1: If Cady is part of The Plastics, then she is cool and fashionable.
P2: Cady is not part of The Plastics.
C: Cady is not cool and fashionable.

This is a fallacy as just because a person is not part of The Plastics does not mean that she is not cool and fashionable. This erroneous way of thinking is also used in commercials and advertisements. The message is that the only way to be cool, sexy, fashionable and respectable is to own certain brand-name goods. Otherwise the person is not cool, not sexy and not fashionable.

Informal Fallacies

Appeal to Guilt/Compassion/Emotion

In this fallacy, the arguer appeals to guilt, compassion or one's emotion to establish his or her claim. An example of an appeal to guilt and compassion is John Lennon's "Happy Xmas (War Is Over)". On the one hand, the lyrics talk about people looking forward to "a very merry Christmas and a happy New Year". But the music video shows footages of victims of war all over the world - a crippled man, the injured in the hospital, a father weeping over his dead family members, severely starved children in Africa etc. When John Lennon sings that "And so this is Christmas, I hope you have fun", the image on the music video is a grieving father carrying his dead baby. The incongruent juxtaposition of the words and images is meant to produce a sense of guilt at our own preoccupation with pleasure and enjoyment, and a sense of compassion for the victims of war. The message is that we need to stop all wars out of a sense of guilt and compassion. But this is a fallacy as not all wars are wrong and should be stopped. Even if a particular war should be stopped, it should be motivated by justified reasons, not out of personal and subjective feelings and views.

Equivocation

In this fallacy, the arguer appeals to the double meaning in a word. As mentioned earlier, this is due to some words being ambiguous. An example is from the film, "The Man Who Sued God". It is about a man, Steve Myers, whose fishing boat was destroyed by lightning one day. He was furious when he tried to claim from his insurance company and was told that the company was not liable to pay as it was purely an "act of God". The insurance company took the phrase to mean a sudden uncontrollable event produced by natural forces such as lightning. However, Steve Myers took that literally to mean an act by a supreme divine being. That led him to sue God and bring a law suit against the churches. His argument is fallacious as he has adopted a different meaning of the phrase "act of God" from what was intended by the insurers.

Tu Quoque (You Too)

In this fallacy, the arguer appeals to the other person's fault when trying to justify his or her own action. An example is from the film "Salem Witch Trials". When a woman who was accused by

an observer of being a witch was told that she was a sinner, she retorted: "Have you not sinned yourself?"

This argument is fallacious as even if the observer has indeed sinned, it does not absolve the woman of her sin. What she needs to argue is to produce evidence to show why she is innocent and that she is not a witch.

False Appeal to Authority

In this fallacy, the arguer appeals to a source of authority who does not have the qualification to make the right judgement. An example is found in the same film "Salem Witch Trials". A number of women were accused of being witches and brought to court. Despite vehement denials and lack of evidence, these women were convicted largely because of the allegations of the two girls. These two girls had convulsions and accused a number of women of being witches and torturing them. Based on their claims, a total of 19 women, a number of them pious women of good reputation and faithful members of the church, were put to death. At one point, a woman who was accused and sentenced to be hanged turned to the audience and said:

"You've taken God's role upon yourself."

This is a case of false appeal to authority. An accepted appeal to authority in this case would be a judge who is impartial and who bases his or her judgement on all known relevant evidence. Indeed, that was the argument of the governor who could not stop the witch trials until it was too late. He told them at the end:

"I believe you have been deluded… you do not heed logic… how could decent men and women … become deaf to the simple voice of their own heart? How could this happen here?"

Ad Populum

In this fallacy, the person argues that something must be right or wrong because most people think so / do it. An example is found in the film "School Ties". It is about a Jewish boy David (acted by Brendan Fraser) who received a scholarship to an exclusive prep school. He soon became a star athlete and a school hero. But his Jewish identity was exposed one day and his whole world turned upside down. His friends started to ostracise and condemn him and even his girlfriend left him. This is the fallacy of ad populum as his friends in the school reasoned that it was right to discriminate against David because most people in the school approved of it and were doing the same thing.

Hasty Generalisation

In this fallacy, the argument is that what is true of one/few member(s) of a class is true for all members of that class. This fallacy is found in the same film "School Ties". David was condemned not because of anything he has done but because he belongs to a certain ethnic group. When he tried to tell them that "I'm the same guy", they told him:

" X (a certain ethnic group) are different. ... You'll still be a God d***ed X (a certain ethnic group)."

Many times, many forms of discrimination (race, gender, nationality, religion, age etc) are due to this fallacy.

False Dilemma

In this fallacy, the argument is that there are only two mutually exclusive options to a situation (i.e. no third option). An example can be adapted from the music video by Cyndi Lauper, "Girls Just Wanna Have Fun". The song is about a girl proclaiming that girls like herself want to have fun by going out at night with friends, and not hide at home. The music video shows the girl, acted by Cyndi Lauper herself, having fun and partying with a group of people. The music video also shows the father yelling at the girl (acted by Cyndi Lauper) and she pleading to her father. The father's assumption is that by going out and wanting to have fun, she has turned bad and no longer cares for him. So the false dilemma is:

(1) Cyndi does not have fun and thinks that her dad is number one.
(2) Cyndi has fun and no longer thinks that her dad is number one.

This is a false dilemma as she could still have fun and yet loves her father. As pointed out by Cyndi herself in music video when she tells her father:

"My father yells what you gonna do with your life. Oh daddy dear you know you're still number one, but girls they want to have fun."

So the third option is this:

(3) Cyndi has fun and thinks that her dad is number one.

Weak Analogy

In this fallacy, the arguer compares two objects which have common properties but are not relevant to the argument. An example is the music video by Rage Against The Machine, "Renegade Of Funk". The song draws a parallel between past revolutionaries and present day hip hop artists. The music video shows footages and photographs of past revolutionaries such as Martin Luther King Jr. and Rosa Parks, and hip hop singers such as Beastie Boys and Afrika Bambaataa. The lyrics draw an analogy between the two groups of people, arguing that they are all renegades:

"Now renegades are the people with their own philosophies, they change the course of history. Everyday people like you and me, we're renegades, we're the people with our own philosophies, we change the course of history."

Here the song writer is trying to say that hip hop artists are like past political revolutionaries as they have their own philosophies and they change the course of history. Are these similarities

sufficient for us to conclude that hip hop artists are like past revolutionaries? It can be argued that the analogy is weak. Past revolutionaries have their own philosophies in terms of their moral and political convictions but not hip hop artists. The latter may have their unique way of musical talent but they did not propagate any social and political ideologies or radical change. Past revolutionaries also change the course of history by bringing about certain social and political reforms, such as their struggle against racial discrimination. But the same cannot be said about hip hop artists.

False Cause

In this fallacy, the person argues that an event A is the cause for another event B simply because A occurred before B. An example is the film "Super Size Me". It is about a man Morgan Spurlock who wants to test his hypothesis that fast-food restaurants contribute to the general obesity in America where 60% of the people are overweight. So he subjected himself to an experiment where he ate nothing but food from McDonald's for 30 days. One of the scenes shows him visiting a school. The school principal told him that the school had gotten rid of all food high in fat and sugar in the canteen and only serves healthy food now. The principal then claims that the students' behaviour is better now since the change of diet. Her claim is based on the timing of the change: there was a change in the food served in the canteen and then the students' behaviour improved. But this is a fallacy as just because something happens before something else does not mean that there is a cause-effect relationship. The principal needs to give more evidence if she wants to establish her claim.

Red Herring

In this fallacy, the person argues that something is the case due to a premise that is irrelevant. It works by giving a reason that appears to support the conclusion but in fact serves to distract the audience from the crux of the matter. An example is the film "American History X". It is a film about a family who is torn apart by racism. The protagonist is Derek (acted by Edward Norton) who became a leader of an extreme racist white power movement. The story narrates how his violent act led to a brutal murder and jail sentence, and how his friendship with an African-American led him to be ashamed of his past. While he was still burning with racist hatred against the non-Whites (minorities in America), Derek told a reporter this:

"Minorities don't give two s**** about this country! They're here to exploit...not embrace."

He gave the following reason:

"Every problem in this country is 'race' related. Every problem, not just crime. These problems are rooted in the black community, the Hispanic community, the Asian...every non-Protestant group in our society. Look at the s***. Immigration... welfare...AIDS...they're all the problems of the non-white. Look at the statistics."

Derek is arguing that the non-White are to be blamed for every problem in the country because these people are out to exploit the country.

(1) Every problem in the country is related to the non-White.
(2) Non-whites do not care about the country and are there to exploit it.

But the reason given, premise (1) is not relevant to the conclusion that Non-whites do not care about the country and are there to exploit it. On the surface, (1) appears relevant to the argument against the minorities. But it is in fact a read herring as it has nothing to do with the attitude or behaviour of the minorities in the country. While it is true that the minorities are plagued with many problems, this is not due to their lack of concern or exploitative behaviour towards the country. The problems faced by the minorities are due to the prevalent poverty that they experience in the country. This point has been pointed out by the reporter and indirectly recognized by Derek himself:

Reporter: Most of these issues you're referring to though son are related to--
Derek: No no no! Don't say poverty right now cause that's not it.

Ad Hominem

In this fallacy, the arguer attacks the person instead of his/her argument. An example is from the same film "American History X". Derek and his younger brother Danny attended Venice High School who has a principal Dr. Bob Sweeney who is African American. He is a good and caring principal who wants to convince Danny that is wrong to be a racist. But Danny has a good friend who is a skinhead and a former student of that school. He dismisses the principal's argument as follows:

"Sweeney's a f***in' n****r on a powertrip, Vinyard. That's what he was like when we were there and that's how he is now. It'll never change either. A n****r is a n****r".

This is an example of ad hominem argument where a person's argument is rejected by attacking the person who makes the argument.

The following guidelines are helpful for you to identify fallacies (Browne & Keeley, 2010):

- Identify the conclusions and reasons. Always keep the conclusion in mind and consider reasons that you think might be relevant to it; contrast these reasons with the author's reasons.
- If the conclusion supports an action, determine whether the reason states a specific and/or concrete advantage or disadvantage; if not, be wary!
- Identify any necessary assumption by asking yourself, "If the reason were true, what would a person have to believe for it to logically support the conclusion, and what does one have to believe for the reason to be true?"
- Ask yourself: "Do these assumptions make sense?" If an obviously false assumption is being made, you have found a fallacy in reasoning, and that reasoning can then be rejected.
- Check the possibility of being distracted from relevant reasons by phrases that strongly appeal to your emotions.

Checklist: 12 key questions to help us identify, analyse and evaluate arguments:

(1) What is the guiding principle in understanding arguments?
(2) What is an argument?
(3) What is an assumption?
(4) How are the terms defined in an argument?
(5) What are some key points about premises?
(6) What are some key points about conclusion?
(7) What type of argument is given?
(8) What are the criteria for a good argument?
(9) Are the premises true or acceptable?
(10) Do the premises support the conclusion?
(11) Are there other relevant known factors to take into consideration?
(12) Is there any fallacy in the argument?