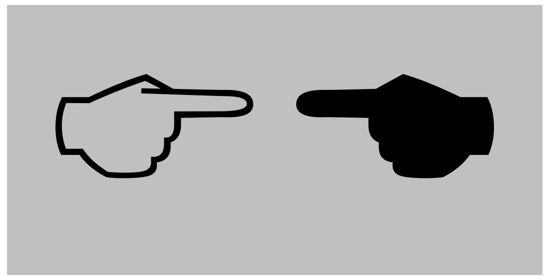


SKI 3002

Argumentation II

UCM 2017-2018

General Information

Course Objectives

SKI 3002, Argumentation II, is the sequel to Argumentation I. In this respect the main objective of Argumentation II is to develop the skills of argument analysis and design further. The particular focus of this skills training will be on the structure of arguments. At the end of the course students should be able to:

- formally evaluate the validity of arguments by applying the basic methods of sentential logic;
- identify the different functions different parts of an argument fulfill according to the Toulmin model;
- build and present arguments of their own according to the Toulmin model.

Description of the course

The course consists of two main parts. The first one is about sentential logic, the second one introduces the Toulmin model to evaluate and construct arguments.
The part on logic introduces a strictly formal, almost mathematical way to analyze arguments. Particular attention will be paid to testing argument validity. The focus of this part lies purely on the structure of arguments. In that respect the first step to analyze arguments is to get rid of their content by translating sentences into symbols. This will be practiced in the first week of the course. Additionally the first week introduces students to syllogisms, i.e. deductive arguments consisting of three parts. In the second and the third week the tools for checking whether an argument is valid or not are introduced: truth tables and semantic tableaus. In week four a midterm exam takes place testing whether the main principles of logic have been understood. To facilitate preparation for the midterm a question and answer lecture takes place in week four as well.
While the first part of the course serves the purpose to train skills with regards to logical reasoning, the second part aims to train how such skills can be applied to arguments to which a strictly formal way of analysis cannot be applied. To achieve this end the Toulmin model is introduced in this part of the course. This model is less formal, yet at the same time more sophisticated in the sense that it identifies the different functions that premises can fulfill, depending on their logical position within the argument. To practice how to use the Toulmin model, in week five the model is applied to small arguments. Taking the next step the model is applied to an academic article in week six. Finally, in week seven the model should be used to design an argument. This constitutes also the final assignment of the course.

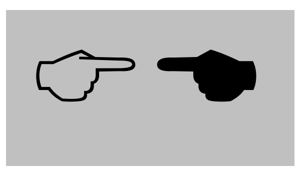
Literature

The literature for this course consists of a number of E-readers. The descriptions of the exercises in this course manual indicate which E-reader(s) should be read for a respective week.

Instructional Format

This skills training will consist of weekly tutorial group meetings. Additionally two lectures will take place during the course. In week 4 a question and answer lecture will take place. This lecture will provide students with the opportunity to prepare for the mid-term exam by asking questions about the example exams. In week 6 Teun Dekker will elaborate on the application of the Toulmin model, drawing on experiences from his own research.

The tutorial meetings will take place once a week and serve the purpose to apply/practice the methods and techniques introduced in the course manual and the literature. To ensure that the time during tutorials is used effectively it is essential that students thoroughly prepare each meeting in advance. **The course manual is divided into 6 weekly sections. It is expected that the students have read these sections before the actual meeting takes place. The sections also include exercises, the exercises in the respective section need to be made at home prior to the tutorial, so that the results can be discussed during the tutorials.** In the course manual, these exercises are marked (as indicted by the sign below) and can always be found at the end of the task section:



Students will only be eligible for a resit if they have handed in all the assignments, for-grade as well as not-for-grade.

Since the tutorial meetings are not split in pre- and post-discussions, the problem based learning (PBL) format is not applicable to this skills training. Instead, students will discuss the solutions to the exercises (with support of the tutor). Depending on the group dynamics, this could also mean that the tutor might be more active in leading the discussion than students are used to from the traditional PBL format (nevertheless, active student participation is crucial).

Course Overview

Week 1 (30.10.-03.11.)	- Read Task 1 and prepare the exercises - Tutorial on Task 1
Week 2 (06.11.-10.11.).	- Read Task 2 and prepare the exercises

	- Tutorial on Task 2
Week 3 (13.11-17.11.)	- Read Task 3 - Tutorial on Task 3
Week 4 (20.11.-24.11.)	- Question and answer lecture - MIDTERM EXAM
Week 5 (27.11.-01.12.)	- Read Task 4 and prepare the exercise - Tutorial on Task 4
Week 6 (04.12.-08.12.)	- Read Task 5 and prepare the exercise - Tutorial on Task 5 - Lecture: Applying Toulmin
Week 7 (11.12.-15.12.)	- Read Task 6 and prepare the exercise (preparation for second assignment) - Tutorial on Task 6 (presentation of arguments)
Week 8 (18.12.-22.12.) – Reflection Week	DEADLINE FINAL ASSIGNMENT: Exact time and date to be announced on Student Portal

Attendance Requirement

Students may fail to attend one meeting without further consequences. Those who miss two meetings may apply for an additional assignment, while those who miss three (or more) meetings will fail the course. This is in accordance with UCM policy.

Assessment

This learning community has two moments of assessment, one in week 4 and one in week 7. The assignments that are graded are indicated in the course manual in boxes like this:

> **Exam/assignment:**
>
> This is an Example

The first assessment is a closed book exam on sentential logic. In the appendix of this course manual an example exam can be found. The format of the actual exam will be the same as the format of the example exam, so it is possible to get an idea of what to expect by looking at the example exam. However, it cannot be guaranteed that the difficulty level of the actual exam will be the same as the one of the example exam.

The second assessment is a take-home assignment. For this assignment it is required to apply the Toulmin model to build your own argument for a paper. Further instructions about this assessment and the grading policy can be found on pages 40-42.

The exam counts for 40% of the final grade, while the final assignment counts for 60%.

Resit Policy

Students who fail the course because their overall grade is below 5.5 will be allowed to retake the assessment they failed. If students fail both, the exam and the final assignment, they have to retake both assessments. The grade given for the resit(s) will replace the grade for failed assessment(s). To be eligible for a resit students have to:

- meet the attendance requirements of the course;
- have made a serious attempt to pass the regular moments of assessment;
- be able to proof that they have completed all the assignments that are required for the tutorial meetings.

Course Coordinator

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Task 1: Introducing logic: Syllogisms, sentential logic & symbolization

1.1 The validity of arguments introduced

In Argumentation I, we have evaluated arguments in terms of cogency. Strictly speaking this is a rather *informal* way to evaluate arguments. Trudy Govier's ARG-method offered a first tool to assess the quality of arguments, but it is a rather blunt tool. Yet, the ARG method showed that it is possible to distinguish between the content and the form of arguments. This implies that, even without knowing or understanding anything at all about the content of an argument, we might be able to find flaws in its structure, which would disqualify an argument regardless of its content.

If we focus entirely on form, it is possible to apply a strictly formal evaluation procedure to our arguments. Of course, such an analysis will not be complete, since it neglects considerations of "acceptability", but it will allow us to be much more precise in our analysis regarding structure.

What we try to establish when we look at the structure of an argument is the *validity* of the argument.

Logic can be defined as the study of the validity of arguments. It explores and defines the rules that determine whether an argument is valid – whether we should accept it *on the basis of its form or structure*.

As we discovered Argumentation I, formalizing statements into symbols helps us recognizing the underlying structure of an argument.

1.1.1 Syllogisms

An early attempt at formalizing arguments dates as far back as **Aristotle** (384-322), who introduced a way of creating a structure that is known as "syllogism". Generally speaking, a syllogism is a deductive argument in which a conclusion is inferred from two premises. Aristotle distinguished between three types of syllogism: categorical, disjunctive, and hypothetical.

A well-known example of a categorical syllogism runs as follows:

All humans are mortal
<u>Socrates is human</u>
Socrates is mortal

Two premises combine into a new conclusion. Or rather: the conclusion is a connection of the two premises. It reveals how a feature of a certain group (the mortality of humans) applies to an individual member of that group (Socrates, who is member of the group “humans”). Mortality (or more precisely “are mortal”) is the *major* term of this syllogism, Socrates the *minor* term. A third term (“humans”) connects or mediates between two other ones (“mortal” and “Socrates”). In syllogisms, this term is therefore called the *middle* term or *terminus medius*.

In this example, “mortal” is a feature, characteristic, or *predicate* of humans; and Socrates is the *subject* belonging to a certain group. The mediation on the part of the middle term results in a conclusion in which the *predicate* now applies to the *subject*: the mediator has brought subject and feature together, it has connected the particular to the general.

We could take one step further away from content and exclusively look at structure, by replacing the nouns and adjectives in both premises and the conclusion with a symbol, say, a letter:

All M are P
<u>S is M</u>
S is P

We could abbreviate this even further:

M P
<u>S M</u>
S P

Now, M represents the *terminus medius* or mediator, P represents the major term or predicate, and S the minor term or subject. As you can see, once the mediator has done its work, it disappears. The conclusion only employs major and minor term, *subject* and *predicate*.

In this example, a universal statement (“All humans are mortal”) is combined with a particular statement, a statement about one or more individuals (“Socrates is human”). The result is another particular statement: something is being said about *one* individual member of a group (as opposed to *all* individuals within a group). The syllogism so to speak creates categories, or includes particular things or individuals into, or excludes them from a category. In our example, Socrates is being *included* into the category “mortal”. For this reason, this kind of syllogism is also called *categorical syllogism*.

All in all, by making different combinations of premises and terms, we can discern four different structures of categorical syllogisms that lead to different types of conclusions:

- Universal assertions ("All humans are mortal")
- Universal negations ("No human will live forever")
- Particular assertions (like the one in the example: "Socrates is mortal")
- Particular negations ("Socrates is not a broomstick")

In traditional syllogistics, these various statements combine into four types of syllogisms:

All M are P	No M are P	All M are P	No M are P
All S are M	All S are M	Some S are M	Some S are M
All S are P	No S are P	Some S are P	Some S are not P

Note that 'a' or 'one' in this case is a form of 'some': all versus some is the distinction between general and particular. Our syllogism about Socrates is thus an example of the third kind of syllogism.

Similar structures can be derived for the other two types of syllogisms, the disjunctive and the hypothetical types.

Disjunctive syllogisms:

Either A or B	Either A or B	Either A or B	Either A or B
A	B	Not A	Not B
Not B	Not A	B	A

Hypothetical syllogisms:

If P, then Q	If P, then Q
P	Not Q
Q	Not P

The preceding paragraphs are a very brief introduction to syllogisms. If you would like to know more about syllogisms you can read the following:

- Freeley, A.J. & Steinberg, D.L. (2004). The structure of reasoning. In *Argumentation and debate: critical thinking for reasoned decision making.* (11th ed.; pp. 137-141). Wadsworth.

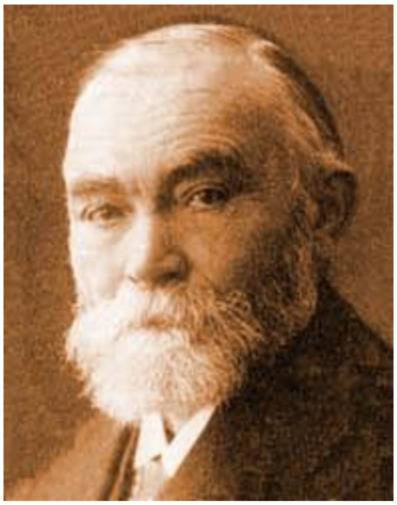
Since the discussion about syllogisms serves simply as background information about the foundations of logic, syllogisms will not be part of the exam. In this respect the above-mentioned literature is not mandatory to read.

1.1.2 Sentential logic

As we have seen, syllogisms can help us categorize certain types of arguments, but many relations are hard to express in traditional syllogisms, such as the ones below:

….. and …..
….. or …..
not…..
if….. then…..
if and only if….. then…..

We call these particular relations conjunctions, disjunctions, negations, conditionals and bi-conditionals, respectively[1].



Since the early syllogisms, logic has developed into a highly sophisticated discipline, with many braches and sub-disciplines. A major breakthrough came in 1879, when **Gottlob Frege** (1848-1925) published his *Begriffsschrift*, in which he introduced a revolutionary way to symbolize arguments. This opened up a wide range of new possibilities of making inferences, or even "calculations" in logic. Slightly modified by others, Frege's system still forms the basis of modern logic.

In the remainder of the first part of this skill training you will be introduced to:

1. the basic symbolizations of this system, and
2. a way of establishing the validity of simple arguments, using truth tables and semantic tableaus.

1.2 Symbolizing arguments

The symbolization of arguments prepares them for logical analysis. Symbolization has a lot in common with the "standardization" we learned in Argumentation I, but it takes an important next step: by replacing words or entire phrases by symbols, it radically moves away from any content. We focus entirely on structure. In this sense the symbolized elements of arguments could be regarded as variables, and the terms that connect them as expressing how these variables relate to each other.

[1] There are even more complicated ones, involving modalities (it is *necessary/possible* that…) or combinations of particulars and universals with modalities, or… ones that are even more complicated than that…
For this Learning Community, we will limit ourselves to the short list above.

Five steps towards symbolizing an argument:

1. **Identify the premises**
2. **Within the premises,**
    a. **identify the singular sentences and**
    b. **the words connecting these singular sentences, the *connectives*: and, or, if, then, not.**
3. **Make a dictionary**
4. **Replace each singular sentence by a letter (capital)**
5. **Replace each connective by a connective symbol**

Example:

(a) “I am telling you, if John plagiarizes, Louis will get mad”
(b) “Well, you know, John *does* plagiarize!”
(c) “In that case, Louis definitely will get mad!”

Step 1: identify the premises.
We saw that arguments are made up of one or more premises and a conclusion. Sometimes a premise is just one simple statement, a singular sentence, sometimes it is made up of several statements, and should be taken as one compound sentence.
When you try to identify the various premises and the conclusion, start by weeding out the irrelevant, ornamental and redundant words. Reduce each sentence to its essence:

(a) If John plagiarizes, (then) Louis will get mad.
(b) John plagiarizes
(c) Louis will get mad.

Step 2: identify singular sentences and connectives
Obviously, the two singular sentences in (a) are “John plagiarizes”, and “Louis will get mad”. They are connected by “if”, and by an implied “then”. Welded together by the “if…then...” connective they form one premise. Both singular sentences return as premise and conclusion respectively.

Step 3: make a dictionary
Indicate which symbol replaces which singular sentence. Remember, the singular sentences themselves do not include the connectives, and should be simple, without all the colloquial ornamentation. In our example, the dictionary would be:

P = John plagiarizes
L = Louis gets mad

Step 4: replace each singular sentence by a letter
Once we have identified the singular sentences, we should distance ourselves completely from their content. The symbol that we choose may be inspired by the

words of the singular sentence, but it should not be chosen because it conveys the content or meaning of the sentence, or words in the sentence.
“John plagiarizes” could be replaced by a J (inspired by “John”) or a P (“plagiarizes”), but in a sense this is completely arbitrary.

In other words: **Do not try to put meaning into the symbols!**
So, no JP, or P^J or J_P to indicate that it is John who plagiarizes, or that the plagiarizing is done by John. Once we start symbolizing, the meaning of the words and the content of the singular sentences become irrelevant.
This also means that if someone or something appears in more than one singular sentence, we do not have to (or should not try to) make this visible in our symbolizations.
“John plagiarizes” and “John explores the internet” might become “J” and “I”, respectively, or even simply “A” and “B”, but *not* “JP” and “JI”, or “J^1” and “J^2”, etc.

Our example, after symbolizing the singular sentence, could look something like this:

(a) If P, then L
(b) P
(c) Therefore, L

The singular sentences of our written arguments have now become the *terms* of our symbolized argument.

<u>Step 5: replace each connective by a connective symbol</u>[2]
What remains now of the original sentences of our example, are the connectives “if…..then…..”, and “therefore”, indicating that we are drawing a conclusion.
For each of these, and the other connectives mentioned above, there is a standard set of symbols. Here, you are *not* free to choose your symbols, but you have to follow the rules. For some connectives, an alternative notation is given. In these cases you should feel free to choose, but whatever you decide: be consistent.

[2] As you will see in the box below, different authors use different symbols. The symbols listed in the box below outside of parentheses are those that you will find in the e-readers, the symbols inside the parentheses are alternatives that can also be used.

Symbolization of Connectives		
Replaces	**Formal name**	**Symbol**
"…and…"	**conjunction**	**• (or ∧, or &)**
"…or…"	**disjunction**	**∨**
"if… then…"	**conditional**	**⊃ (or →)**
"…if and only if…"	**biconditional**	**≡ (or ↔)**
" not…"	**negation**	**~ (or –, or ¬)**
Symbol for conclusion:		**∴**

1.3 Dealing with connectives

Note that all the connectives (and their symbols) imply binary relations: there is always one symbol preceding, and one symbol following the connective:

A•B, A∨B, A⊃B, A≡B

The negation sign is the only exception: it does not *connect two* singular sentences or terms, but simply *negates one*. A negation of a term can be simply performed by writing the negation sign in front of the symbol representing the sentence:

~A, ~B, etcetera.

If premises contain more than two terms, we may need parentheses to indicate which connective applies to which term:

(A∨B) • C
is not the same as
A ∨ (B • C)
(Do you see why?)

Symbolization should always be structured as singular or binary combinations, even if it doesn't seem to matter where we put parentheses. When we start discussing the way to establish the validity of an argument you will see why. So: *not* (A • B • C), but (A • B) • C, or A • (B • C).
(Do you see why it doesn't matter where you put the parentheses here?)

Applying these symbols to our example, we get to the final stage of complete formalization:

(a) $P \supset L$
(b) P
(c) $\therefore L$

Or, without the now redundant sentence indicators (a), (b) and (c):

$P \supset L$
P
$\therefore L$

Once we symbolize an argument, we always start with the premises, and end with the conclusion – even if the conclusion originally was at the beginning of the argument in English. "Louis will get mad. For whenever John plagiarizes he does get mad. And now John has plagiarized", would have the exact same symbolization as our original argument.

Exercise

Read:

- Klenk, V. (2008): Symbolizing English sentences. In Understanding symbolic logic (5th ed., pp.51-69), and pages 257-266 of: Govier T. (2005). Deductive arguments: propositional logic.

Afterwards symbolize and create a dictionary of the following sentences:

1. Neither Argentina nor Brazil is a member of the OECD.
2. Argentina and Brazil won't both be members of the OECD.
3. China is the most populous country in the world, yet it isn't the most liberal.
4. China is not the most liberal country, but its economic performance is pretty impressive.
5. India is not the biggest country in the world, nor is it the most powerful one.
6. Switzerland does neither align militarily with other countries nor reveal its bank secret.
7. India is not both the biggest and the most powerful country.
8. The US is member of both organizations, the UN and NATO
9. Switzerland does not do both align militarily with other countries and reveal its bank secret, but recently cooperated with foreign tax authorities.
10. If the USA produces more atomic weapons, there must be a cold war going on.
11. If it is one of the two most populous countries in the world, but it is not a democracy, it must be China.
12. Only if there is a cold war going on, the USA produces more atomic weapons.
13. If this is Germany and it wages an offensive war, it breaches its constitution.
14. Democracy must be wonderful, provided that this is an authoritarian state.
15. Unless the unemployment rate decreases the president faces low chances of getting re-elected, provided that he is in his first term.
16. Portugal, Spain and Greece are members of the EU, yet they are also members of the UN.
17. Chile and Argentina are both Latin-American countries, but at least one of them is an OECD member.
18. England, France and the USA have won the Second World War. Still, at least two of them are not superpowers.
19. An increase in government funding is a necessary condition of an improvement in the quality of education, but not a sufficient condition.
20. The US was able to invade Afghanistan, because it has the military strength to do so.
21. The conflict in the Middle East will be resolved only if Israel stops building settlements, or it will be resolved if no qassam rockets are launched from the Gaza strip.

22. Sanctions on Iran will be loosened if and only if it abandons its nuclear program and stops supporting Hezbollah.

Then, symbolize the following three arguments, following the five steps:

1. "Have you noticed this too? Always if unemployment rates are declining, or if the OPEC increases the oil price, inflation increases!" "You're right. And when the latter happens, the European Central Bank raises the interest rates"
   "I read in the newspaper yesterday that the OPEC increased the oil price."
   "Mmm. I suppose interest rates will go up."

2. Only if neither demand increases, nor supply decreases, prices will remain constant. Unless technological change occurs, supply does not decrease and prices will remain constant. So, if technological change occurs demand does not increase.

3. If you like Hillary and Donald, you do not care about US politics or you are in a state of cognitive dissonance. Provided you care about US politics, then you are not in a state of cognitive dissonance if and only if you either like Hillary or Donald, but not both. You do care about US politics, but are not in a state of cognitive dissonance. Therefore you do not like both, Hillary and Donald.

Task 2: Checking for validity – the truth table

2.1 Validity and soundness

As it was noted before, there is a difference between the content of an argument, and its structure or form. Validity has been used so far in conjunction with the structure of an argument. But when exactly is an argument valid?

A valid argument is an argument whose premises, if we assume them to be true, necessarily lead to a true conclusion.

This means that:

A valid argument can *never* have a false conclusion following from premises that are assumed to be true.

Please note that validity is still all about form, even though reference to truth may suggest that the *meaning* or *content* of the words and sentences in the argument also plays a role. However, as far as validity is concerned, we just *assume* the truth or falsity of premises and conclusion.

How this truth (or falsity) should be established is not a matter of logic, but rather of another branch of philosophy that deals with language, and theories about truth. We will not go into these theories, as we are mainly concerned with the structure of our arguments.

But if we would explore the complicated concept of truth, and be able to come up with a set of criteria, we might be able to decide if a valid argument is also *sound:*

A *sound* argument is a valid argument with true premises.

Leaving *soundness* for ponderings through sleepless nights and afternoon bar talk, we will focus on validity.

We may conclude that the following applies to validity, which allows us to concern ourselves with the structure of arguments, regardless the meaning and truth of its components:

Validity is:

***topic neutral*, it does not depend on the subject matter of the argument, and it is**

***truth independent*, it does not depend on the actual truth of the premises.**

2.2 Truth and falsity: the truth table

Even though we won't concern ourselves with the actual truth of premises, truth plays a crucial role for validity. If we accept the truth or falsity of a premise as a given, we still need to know how truth and falsity affect the arguments we are analyzing. After all, only when true premises lead to a true conclusion we may speak of a valid argument.

It seems beyond dispute that a sentence is ultimately either true or false – and not both. Maybe a certain sentence may be true in one context, and false in yet another, but within the given context it can never be both at the same time. (If in doubt, try to formulate a sentence that is *really* true *and* false at the same time within the same context.)

We say that there are two "truth values" – true or false -, and that they are mutually exclusive. These two values are symbolized as follows:

Symbolizing truth values:

True: T (or 1)

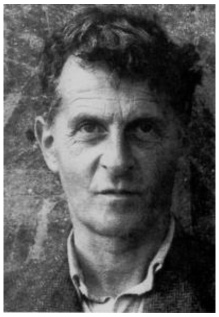
False: F (or 0)

As you can imagine, the impact of the truth value of terms depends very much on the connective(s) that bind(s) terms together.

Look at these two symbolized sentences:

(a) $A \vee B$
(b) $A \bullet B$

If, say, A happens to be true, and B false, we might accept that the disjunction of A and B in (a) as a whole is true. Or: the truth of A suffices to make $(A \vee B)$ true as well. ("It rains or Louis is at home" is true if it rains, regardless whether Louis is at home.) But in a true conjunction we expect both conjuncts to be true. In other words, A being true does *not* suffice to make $(A \bullet B)$ true. ("It rains and Louis is at home" is only true if it rains *and* Louis is at home).



For all connectives, the "impact" of the truth value has been defined. In most cases, the resulting values seem rather obvious. They are represented in what is commonly referred to as a *truth table*. The great philosopher **Ludwig Wittgenstein** (1889-1951) in his *Tractatus-Logico Philsophicus* of 1921, introduced the basic format of the truth table as we are still using it today:

T: true F: false							
A	**B**	**~A**	**~B**	●	∨	⊃	≡
T	T	F	F	T	T	T	T
T	F	F	T	F	T	F	F
F	T	T	F	F	T	T	F
F	F	T	T	F	F	T	T

So what does this table tell us? It tells what happens to the truth value of singular sentences, and compound sentences made up from singular sentences, for each combination of truth values for each of the terms (singular sentences, now symbolized by capital letters A/B).

The first two columns display all the possible combinations of truth values for the singular sentences A and B. Column three and four display the negation of A and B and therefore simply display the opposite truth values of the first two columns. The most interesting columns are the last four. In each of these columns the truth value indicated in a particular row is the result of the combination of the truth values for A and B according to the rules of the connective symbol in question.
Most of the values following from these rules are rather intuitive. Some however are less self-evident, and are the result of convention rather than intuition. Particularly the rule for the disjunction and the conditional may seem artificial. We'll have to accept this, however!

From the general truth table we can derive separate truth tables for compound sentences by looking at the relevant column in the general table. The truth table for the sentence

$$\mathbf{A \supset B}$$

would look as follows:

A	B	A ⊃ B
T	T	T
T	F	F
F	T	T
F	F	T

What does this table tell us? It tells us that only if A is true (⊤), and B is false (⊥), the singular sentence A ⊃ B is false. In all other combinations of truth values it is true.

The truth table for more complex compound sentences would follow the same principle, but may be much more elaborate to draw. First of all, we have to be sure that we have put the parentheses in all the right places – grouping together the right terms.

We do that by determining what is called the 'scope' of each connective. In a compound sentence, some connectives may only involve the two terms immediately surrounding it, whereas others involve more terms.

Take, for example, this sentence:

$$\mathbf{(A \bullet B) \supset C}$$

The conjunction involves only A and B (has the smallest scope), but the conditional, by connecting the conjunction of A and B to C, involves all terms (has the biggest scope).

In order for us to be able to see how the various combinations of truth values will affect the truth value of the conditional (A • B) ⊃ C, we will first have to draw all the possible combinations of truth values of the single sentences A, B and C. Since we are dealing with three terms, A, B, and C now, we will also have more combinations, represented by more columns and rows in the truth table we generate. We can calculate that we have 8 possible combinations of truth values (2 to the power of 3).

Let's write all these possible combinations down to generate the first three columns of our truth table[3]:

A	B	C
T	T	T
T	T	F
T	F	T
T	F	F
F	T	T
F	T	F
F	F	T
F	F	F

Next, we need to establish the truth values for the conjunction (A • B). *In other words: we start by establishing the truth table for the connective with the **smallest** scope, and then work our way up to the connective with the biggest scope – in this case the conditional ⊃.*

So we begin by consulting the general truth table provided under the column for • and apply the rules indicated there to the first two columns of the table we just generated. This enables us to create the fourth column of the table as shown below:

A	B	C	(A•B)
T	T	T	T
T	T	F	T
T	F	T	F
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	F
F	F	F	F

[3] Tip: to ensure that you end up with all the possible combinations, indicate half of the lines in the first column as true and the other half as false. For the second column indicate a quarter of the lines as true, another quarter as false, the next quarter as true again, and the final quarter as false. For a third column indicate an eighth of the lines as true, then another eight as false, and so on. Continue this process until you have covered all the singular sentences in the table.

Once we have established truth-values for A • B, we move on to the conditional. Again, we will check the general truth table, under the column for ⊃, and apply the rules of the horseshoe to the third and the fourth column of the table we generated. This enables us to derive the fifth column, which provides us with the final truth-values for the entire compound sentence.

A	B	C	(A•B)	(A • B) ⊃ C
T	T	T	T	T
T	T	F	T	F
T	F	T	F	T
T	F	F	F	T
F	T	T	F	T
F	T	F	F	T
F	F	T	F	T
F	F	F	F	T

This table tells us that only when A and B are true (T), and C is false (F), this compound sentence is false. In all other cases it is true.

2.3 Using a Truth Table to check the validity of an argument

Now that we know how to make truth tables, we can use them to check the validity of symbolized arguments. Remember that a valid argument is an argument where true premises are followed by a true conclusion. This means that if the premises of the argument can be true while the conclusion is false, the argument is not valid. If, however, the conclusion is true whenever the premises are true, the argument is valid.

If it is possible to assign truth values to the singular sentences of an argument, in such a way that its premises are true and its conclusion false, the argument is not valid.

By putting all the premises in the truth table, we can see whether there are cases where the premises are all true, and the conclusion is not. If we find the argument is invalid. If we cannot find any such cases, the argument is valid. Look at the following example:

$G \supset E$
E
$\therefore G$

We can build a truth table, which incorporates the premises and conclusion of this argument. It looks as follows:

Conclusion — Premise 2 — Premise 1

G	**E**	**$G \supset E$**
T	T	T
T	F	F
F	T	T
F	F	T

A case where the premises are true, but the conclusion is false

The first column is the conclusion, the second column is the second premise, and the third column is the first premise. We now ask whether there is a case where the truth values for the premises are **T** and the truth value for the conclusion is **F**. Remember that if this is the case, the argument is invalid.

We indeed see that in the third row there is a case where the premises are true, but the conclusion is not. Hence we know that the argument is not valid.

Example: going all the way from an argument in English to the truth table
Now how do we go from a written argument to a truth table with symbolizations? Let's use this example:

> If the moon is made of green cheese, or snow is white, then Mars is a planet. And whenever it rains, snow is white. So, if it is raining now, Mars must be a planet!

First, we will symbolize this argument, then we'll make a truth table.

Symbolization:

Step 1: Identify the premises and conclusion:

(a) If the moon is made of green cheese or snow is white, then Mars is a planet;
(b) Whenever it rains, snow is white;
(c) (Therefore) If it is raining now, Mars must be a planet.

Step 2: Identify singular sentences and connectives:

(a) (If) the moon is made of green cheese (or) snow is white (then) Mars is a planet
(b) (If) It is raining (then) snow is white
(c) (Therefore) (If) it raining (then) Mars is a planet

Step 3: Make a dictionary

M = the moon is made of green cheese
S = snow is white
P = Mars is a planet
R = it is raining

Step 4: Replacing the singular sentence by a symbol (letter)

(a) If M or S, then P
(b) If R, then S
(c) Therefore, if R, then P

Step 5: Replace the connectives by a connective symbol (determine the scope for each connective, and leave out sentence indicators)

$(M \vee S) \supset P$ (Premise 1)
$R \supset S$ (Premise 2)
$\therefore R \supset P$ (Conclusion)

Now that we have symbolized the argument, we can make truth tables for each premise, and the conclusion. Remember we are looking for a case where the premises are true, but the conclusion is false. If we find it, we know that the argument is invalid.

					P1	P2	C	
R	**M**	**S**	**P**	**(M∨S)**	**(M∨S)⊃P)**	**R⊃S**	**R⊃P**	
T	T	T	T	T	T	T	T	←
T	T	T	F	T	F	T	F	
T	T	F	T	T	T	F	T	
T	T	F	F	T	F	F	F	
T	F	T	T	T	T	T	T	←
T	F	T	F	T	F	T	F	
T	F	F	T	F	T	F	T	
T	F	F	F	F	T	F	F	
F	T	T	T	T	T	T	T	←
F	T	T	F	T	F	T	T	
F	T	F	T	T	T	T	T	←
F	T	F	F	T	F	T	T	
F	F	T	T	T	T	T	T	←
F	F	T	F	T	F	T	T	
F	F	F	T	F	T	T	T	←
F	F	F	F	F	T	T	T	←

The arrows indicate cases where the premises are both true. In all these cases, the conclusion is true as well. Hence there are no cases where the premises are true but the conclusion false. This means that the argument is valid.

Exercise

Please read pages 246-255 of: Govier T. (2005). Deductive arguments: propositional logic.
Afterwards do the following exercises. We will discuss them in class.

1. Create a truth table for the following sentences:
    a. $((L \lor H) \supset B) \supset A$
    b. $((L \lor H) \supset B) \bullet (B \supset A)$
    c. $((L \bullet H) \supset B) \supset A$
    d. $(A \lor B) \bullet \sim (\sim A \lor \sim B)$
    e. $\sim (A \bullet \sim A)$

2. Logical equivalence
   Sentences that yield the same truth table are called "logically equivalent". Check whether the following couples are logically equivalent:
    a. $(A \lor B)$ and $\sim (A \bullet B)$
    b. $(\sim A \lor \sim B)$ and $\sim (A \bullet B)$
    c. $((A \supset B) \bullet (B \supset A))$ and $(A \equiv B)$

3. Arguments
   Use a truth table to examine the following arguments for validity

    a. $G \supset E$
       G
       $\therefore E$

    b. $(A \lor \sim B) \supset C$
       $(\sim C \lor B) \supset D$
       B
       $\therefore D$

    c. $(G \bullet A) \supset E$
       $E \supset P$
       $\sim (G \bullet A)$
       $\therefore \sim P$

Task 3: Checking for validity – the semantic tableau

Please note that the exercises in this section do not have to be done ahead of the tutorial, the exercises are in class exercises. Nevertheless, please read this section ahead of the tutorial.

3.1 The semantic tableau

Summarizing last week's findings:

- A valid argument can never have a false conclusion following true premises;
- The truth values of singular sentences or terms, and the influence of connectives, determine the truth values of compound sentences.

This leads to the following conclusion:

If it is possible to assign truth values to the singular sentences of an argument,
in such a way that its premises are true and its conclusion false,
the argument is not valid.

So if we want to discover the validity of an argument, we may thus turn it into a "hunt for invalidity", or: the possibility of having true premises and a false conclusion.

Regarding simple, short arguments constructing a truth table takes relatively little time. But the task becomes more time-consuming as the number of terms within premises and the number of premises increase. This is why we need a more practical method. A simple way of establishing the validity of an argument is by using the so-called *semantic tableau*.

When we make a semantic tableau, what we do is looking for the possibility of creating true premises and a false conclusion, thus proving the argument to be invalid.
We ask ourselves: can we assign truth values to the premises and conclusion that result into the "forbidden" combination? After all, a valid argument is valid because of its structure, not because of the specific truth values of its constituent terms. If it *does* depend on truth values, it is not valid.

Let us look once more at our simple example

$P \supset L$
P
$\therefore L$

If we want to check this argument for its validity, we set out on a mission of making the premises true, and the conclusion false. If we succeed, the argument is *invalid*. So, what we want to find is this:

T $P \supset L$

T P

F $\therefore L$

For the second premise, it is easy to see what truth value P should have to make the premise true. P *is* the entire premise, so for the premise to be true, P should be true.

Likewise, the conclusion is simply made false if we assign to the truth value “false” to L.

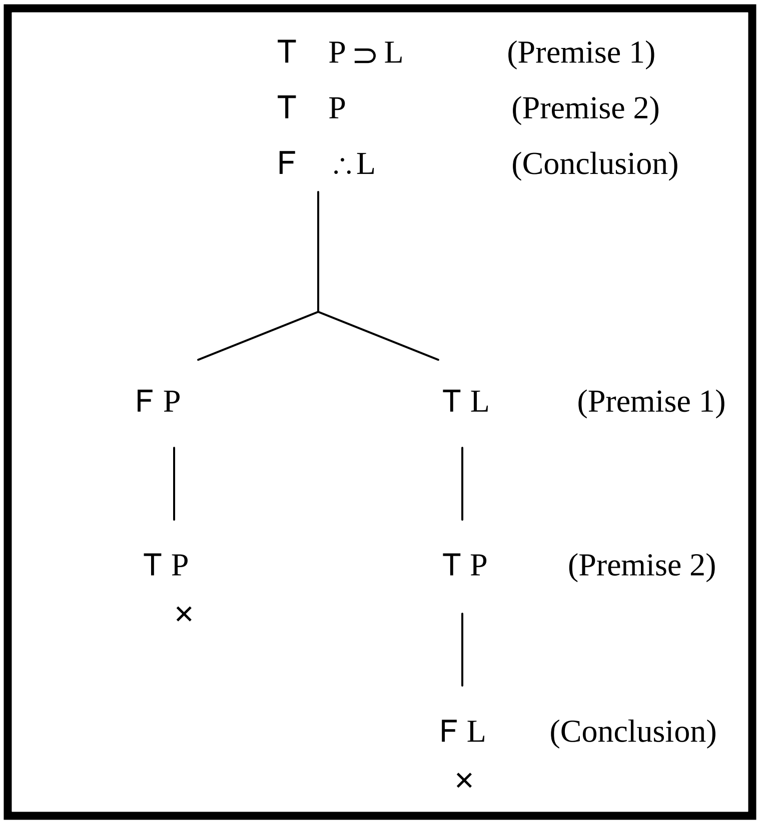
For the first premise, we should consult the truth table for the conditional. When is a conditional true? The truth table tells us that whenever the *antecedent* (what comes before the horseshoe) is false, the conditional is true. And whenever the *consequent* (what comes after the horseshoe) is true, a conditional is true as well.

So for our premise to be true, *either* P should be *false* (F P) , *or* L should be true (T L).

P	**L**	**P⊃L**
T	T	T
T	F	F
F	T	T
F	F	T

We can visualize this information in a *semantic tableau*. For each premise or conclusion, we indicate the conditions for them to have the required truth values. Every new step we take is added to the previous one like a branch on a tree growing upside down. If a branch splits, as is the case with the first premise in our example, we have to repeat the next step under each new branch. A branch splits whenever there are two ways of making a premise true, or a conclusion false.

As we saw above, for the first premise to be true, either P must be false, or L must be true. This is indicated by splitting the tree and writing the two possibilities for the premise being true at the end of the branches.



We then write the required truth values for the second premise under each of the branches. This is simple, as we simply want P to be true. We now see a contradiction in the left branch; in order to have the required truth values, P must be false in premise 1 and true in premise 2. As this is impossible, we know that this cannot be a case where the premises are true and the conclusion is false, which is what we are looking for.

We can now turn to the right branch. We add the conclusion, which needs to be false. And again, we have a contradiction. For the premises to be true and the conclusion to be false, which would show the argument to be invalid, L must be both true and false. This is impossible.

And so we see that there can be no cases where the premises of the argument are true and the conclusion false. We tried to find out what would be required, and seen that this always leads to a contradiction. Hence the argument must be valid.

☞ ☚

Analyze the tableau above.
What do the various steps represent?
Why does the first step branch out while the others don't?

Why are the x marks under both branches?
Do they make sense if we tell you this is a ***valid*** *argument?*

Then try for yourselves if you can do the same for the following example:

$P \supset L$
L
$\therefore P$

With every step you take, check each premise/conclusion in the original argument at the top with a √.
Is this a valid argument?

3.2 The rules for making connections true or false

If we want to be able to establish the validity of arguments using the semantic tableau, we will need rules for all connectives.

We have now established the rule for making the conditional true:

A ⊃ B is true if either A is false, or B is true.

Since we have two possibilities, the semantic tableau in this case branches out, into one branch for A is false (F P), and one for B is true (T L).

If we consult the truth table, we can also establish the rule for making the conditional *false*:

A	B	A⊃B
T	T	T
T	F	F
F	T	T
F	F	T

A ⊃ B is false if *both* A is true *and* B is false.

In this case, there is no branching out into two branches as we need both conditions to be fulfilled. In the Semantic tableau we would rewrite the premise by saying that A needs to be true and B must be false:

$\perp A \supset B$

|

T A

F B

Construct the rules for making the other connectives true, and for making them false by filling in the table below.
Remember:

- *If both sides need to have a certain truth value, they don't branch out and are written below each other.*
- *If each side by itself would be a sufficient condition for truth or falsity, they do branch out.*

The remaining connectives are: • ∨, ≡ and ~.

T: A • B	T: A ∨ B	T: A ≡ B	T: A ⊃ B F: A || T: B
F: A • B	F: A ∨ B	F: A ≡ B	F: A ⊃ B T: A F: B

Symbolize and make a semantic tableau for the following arguments:

1. “Have you noticed this too? Always if unemployment rates are declining, or if the OPEC increases the oil price, inflation increases!” “You’re right. And when the latter happens, the European Central Bank raises the interest rates”
   “I read in the newspaper yesterday that the OPEC increased the oil price.”
   “Mmm. I suppose interest rates will go up.”

2. Only if neither demand increases nor supply decreases, prices will remain constant. Unless technological change occurs, supply does not decrease and prices will remain constant. So, if technological change occurs demand does not increase.

3. If the ECB raises interest rates it follows that the economy is performing well or, if it is the ECB’s goal to keep inflation in check, that inflation rates go up. But inflation rates are not going up. So, the economy is performing well.

4. The unemployment rate in Germany is increasing if Germany’s economy is in recession. Germany’s economy is in recession if the country exports less, and the country exports less if global demand for German products decreases. The global demand for German products is currently decreasing. Therefore, Germany’s unemployment rate must go up.

Week 4: Exam on Sentential Logic: from symbolization to semantic tableau.

During this week a question and answer lecture will take place to facilitate preparation for the exam. If you plan to attend the lecture you should prepare by solving the example exams in the appendix of this manual and on Student Portal.

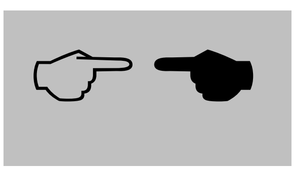
Midterm Exam on Logic

During week 4 there will be an exam on sentential logic. This exam will consist of several arguments that you need to symbolize, and check for validity using truth tables and the semantic tableau. The exam will last 2 hours. It counts for 40 % of your final grade. Please find mock exams in the appendix and on Student Portal. Answers will be posted on Student Portal.

Week 5: The Toulmin model for argument analysis

Classical syllogisms & sentential logic provide us with a powerful way of making claims and assessing the validity of arguments in a formal manner. However, the analyses that can be conducted by these methods are also quite limited, particularly if we want to analyze arguments of others or ourselves. Reducing arguments to sentential logic or simple syllogisms can be useful to get a rough overview of the main reasoning an argument is based on, but constrains our options to conduct a detailed analysis. We need a less formal, yet at the same time more sophisticated toolkit if we are to evaluate more complex arguments. Such a toolkit was created by the British philosopher Stephen Toulmin. He used the traditional syllogism as a foundation for a more detailed model of argument analysis. Indeed, Toulmin's model does more justice to the fact that most of the time we use arguments to convince our audience of a certain point; a point that connects a *particular case or observation* to a *general rule*. This is particularly useful in academe, where we are obsessed with the way the world is captured by theories, and how theories need the world as their empirical foundation. However, the Toulmin model includes more aspects: it informs us in detail about the different functions that premises can fulfill, depending on their logical position within the argument.

Exercise



Read:

- *Toulmin, S. (2003). The Layout of arguments. In* The uses of argument *(pp.94-118), or*
- *Verlinden, J. (2005). The Toulmin model of argumentation. In* Critical thinking and everyday argument *(pp.79-88)*[4].

- *Be prepared to explain in class (in your own words) what the 6 + 1 elements from the model are all about.*

2. Examine the following arguments:

- *Standardize them and draw a pattern corresponding to the Toulmin model and one according the way it was taught in Argumentation I (for the latter you do not have to include the rebuttal or the modal qualifier in the pattern).*
- *For each argument identify the claim, warrant, grounds, backing, modal qualifier, possible rebuttal, and verifiers. Decide whether each of these elements is doing its job properly.*

[4] It is sufficient to read one of the readers. The Toulmin text is the original and written in a more complex manner. The one by Verlinden focuses on the basics and might be easier to grasp.

Interest Rates

It would probably not be a good idea if the European Central Bank would increase interest rates at the moment. We still haven't recovered from the economic crisis. You see, last year economic growth was minimal. It is quite logical that high interest rates do not stimulate economic growth, since people won't spend money if savings offer high returns and if borrowing is expensive. If inflation rates would be high, the issue would be a different one though.

Plagiarism

Wolfgang might be excluded from future examination for up to one year, because he has committed plagiarism. Wolfgang was stupid enough to copy paste paragraphs of one of his old papers into a new paper, without referencing. Safe assignment showed that the 2 papers matched each other by 12%. If he would have read the Rules and Regulations on Education and Examination properly, he would have known that according to article 5.7.2 even presenting your own ideas or words without adequate reference to the source is regarded as plagiarism. We all know that the examination committee is rather strict when it comes to cases of plagiarism and that - according to article 5.7.5b of the Regulations on Education and Examination - they are allowed to exclude a student from examination to up to one year when this student commits plagiarism. Of course, if Wolfgang has a good explanation and a clean record, the committee might be more lenient and just sanction him with a reprimand.

Public Sector Wages

We all know that politicians are paid from taxpayers' money. Hence they should be paid moderate salaries. You see, whatever is done with taxpayers' money should provide value for money. After all, the government should serve the interests of the people, and the people have an interest in getting the best government for the lowest price. Moderate salaries for politicians provide the best value for money, because moderately paid politicians cost less money and are better politicians. Those who take low paying jobs tend to be motivated more by doing a job well than by making lots of money. And obviously, the more motivated one is to do one's job well, the better one will perform.

Distributive Justice

It should be easy to see that the principle of justice that would be chosen in the original position would be the correct one, because the original position is a fair situation. After all, a fair situation models individuals as free and equal, which is exactly what the original position does. Since we know that when people are in a fair situation they would choose the correct principle of justice, it is clear that the principle of justice chosen in the original position would be the correct one.

Now the question arises which principle would be chosen in the original position. Probably, the difference principle would be chosen, because it is suited for rational and risk-averse beings. In the original position, beings are rational and risk-averse, since they have a first ordered interest in the resources with which they will need to live their lives, and if you have a first ordered interest in these resources you will be risk-averse and rational. So, it eventually turns out that the difference principle is likely to be the correct principle of justice.

In-Class Exercise

In an ideal world, writers and arguers would always present their arguments laying out all the elements of the Toulmin model and how they relate. Alas, arguers do not always do so, meaning that it is hard to evaluate whether or not the arguments meet the requirements of the model and are good arguments. Reconstructing such partial arguments is an essential first step in evaluating such arguments. Once one has reconstructed the missing elements in the most plausible fashion, one can then continue to evaluate the argument as before.

Consider the following partial arguments, and reconstruct the missing bits of the Toulmin model, by figuring out how one could most plausibly fill in the blanks. Once you have reconstructed the argument, evaluate the arguments as we did before.

1. Of course taxes should be raised, after the huge amount of public spending in the context of the economic crisis the state needs to generate more revenues.

2. Of course taxes should be reduced, after the huge amount of public spending in the context of the economic crisis the state needs to generate more revenues.

3. Of course wearing a burka should be prohibited; after all we want to promote the freedom of Muslim women living in our society.

4. Of course wearing a burka should not be prohibited; after all we want to promote the freedom of Muslim women living in our society.

5. Since we appreciate social cohesion, we can regard division of labor as something positive.

6. Since we appreciate social cohesion, we can regard division of labor as negative.

7. Of course it is a good idea to introduce austerity measures; after all we want to get out of economic recession.

8. Of course it is not a good idea to introduce austerity measures; after all we want to get out of economic recession.

9. You need to include the Taliban when negotiating about the future of Afghanistan, because stability is of outmost importance in the country.

10. You should not to include the Taliban when negotiating about the future of Afghanistan, because stability is of outmost importance in the country.

11. Of course US hegemony is a good thing; after all we want the international system to be stable.

12. Of course US hegemony is not a good thing; after all we want the international system to be stable.

13. Obviously affirmative action is a good idea; after all we want to ensure that everyone in society has equal chances on the labor market.

14. Obviously affirmative action is a not good idea; after all we want to ensure that everyone in society has equal chances on the labor market.

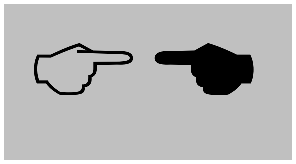
15. Of course top civil servants should be paid moderate salaries! Their salaries are, after all, paid with tax-payers' money.

16. Of course top civil servants should be paid high salaries! After all, we want the most qualified people to work in the public sector.

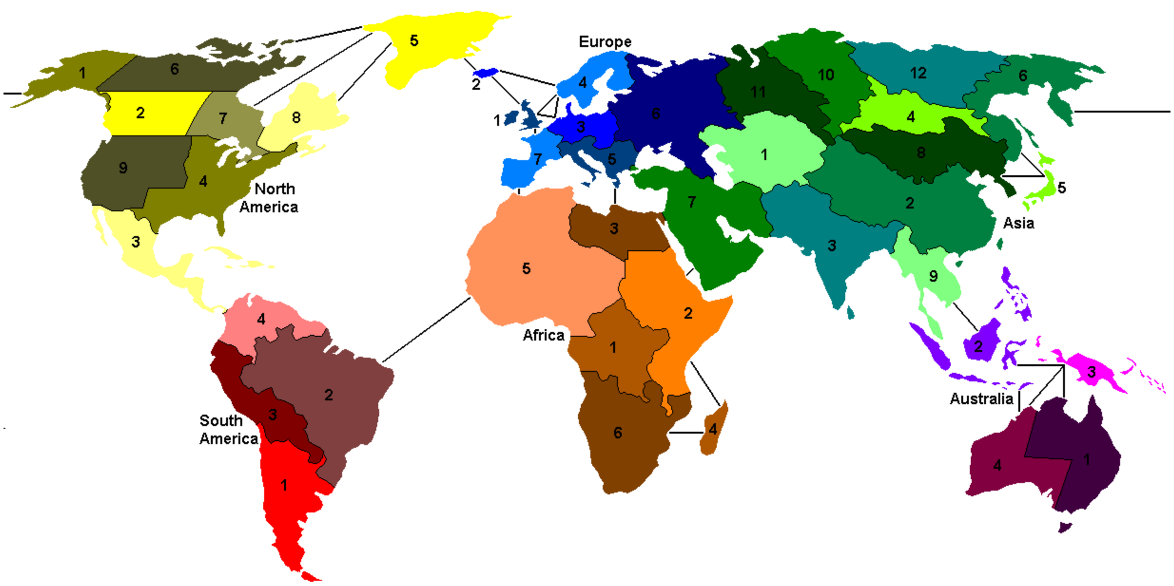
17. Of course top civil servants should be paid moderate salaries! After all, public servants should be familiar with the lives of normal people.

Task 6: Toulmin applied to Huntington

Exercise



1. *Find an academic argument that lives up to the standards of Toulmin's model (i.e. most elements should be present and they should be connected in a way that makes sense). You can look for this in Journal articles, textbooks, lectures, presentations, or perhaps even your own papers. Be prepared to briefly present the argument in class, using Toulmin's terminology.*
2. *Read (probably* again, *for most of you) "The Clash of Civilizations?", the article Samuel Huntington published in the summer of 1993 in Foreign Affairs.*
   You will perform an analysis of the first 13 pages of the article (in which Huntington presents his theory and gives several examples) applying the Toulmin model. Although all 13 pages provide valuable information, ***it is probably helpful to know that your main focus should be on the six explicit reasons Huntington mentions to justify his thesis****. You can apply the Toulmin model to each of these reasons separately. This will help to figure out the core of the argument; the information he additionally provides should be used to shed light on the details.*



Task 7: Using Toulmin to make an argument of your own

So far we have looked at existing arguments and evaluated them using the Toulmin model. But we can also do it the other way around. Rather than going from text to argument, we can go from argument to text. This is helpful when you write a paper. By planning your argument before you write, using the Toulmin model as a template, you are practically guaranteed a 9. All you need to do is write around the argument you have laid out, and add some footnotes. During this week's meeting we will experiment with using Toulmin to make good arguments.

Simply start by deciding what your claim will be. This is your thesis, the answer to your research question. From this you can work backwards, deciding what the warrants and grounds will be. Then add backing and verifiers. These might themselves consist of warrants and grounds. Then decide on your modal qualifier, and consider possible objections.

Exercise

During this period at UCM you will all have to write at least one paper. To help you do well, prepare a Toulmin model for the paper you intend to write. Pick a topic and decide what your research question and thesis/conclusion will be. From there, design a 12-15 premise argument, which contains all the elements of the Toulmin model. Make sure you can explain why you think the argument is good and why each element is sufficient. We will select a few students to present their arguments for critical discussions.

1. *Give a short description of the context in which the paper is to be written, explaining the topic and research question and the way you will answer it;*
2. *" Standardize" (as in SKI2049) the argument you will make by listing the premises, sub-conclusions and final conclusion in an abbreviated manner;*
3. *Represent your argument visually, either by:*
   - *Making a pattern (as in SKI2049); or*
   - *Drawing a Toulmin model.*
4. *Identify all 6+1 elements of the Toulmin model within your argument;*
5. *Explain why you think this is a good argument, i.e. why you think each of the elements of the Toulmin model is present, can be regarded acceptable, and why they are connected in the right way.*

Assignment for grade:

Use your notes from the meeting in week 7 to improve the assignment above. Logically the description of the exercise above also serves as the instruction specifying the requirement for the assignment that will be graded.

A softcopy of this assignment needs to be handed in via Student Portal and a hardcopy via the Office of Student Affairs. The exact date and time of the deadline will be announced on Student Portal during the course. The assignment counts for 60% of your grade.

Grading Policy

In essence the grade of the analysis is based on three main aspects of the assignment:

1. The correct usage of the Toulmin model;
2. the academic level and specificity of the argument,
3. the quality of the argument.

Accordingly five broadly defined classes can be identified with regards to grading.

<u>10-8.0 Excellent:</u> The context in which the argument is made is clearly explained. The argument is made on a high academic level, is sophisticated and specific. Premises are perfectly formulated. No technical flaws in the standardization and the formulation of premises can be detected. The reasoning is perfectly logical, in the sense that it follows the Toulmin model perfectly: every inference works via impeccable syllogistic logic. The argument is self-explanatory and it is clearly identifiable that the Toulmin model was used to structure the author’s thinking about the argument and to organize evidence and ideas. If the argument is not entirely self-explanatory, step 5 (as described above) eliminates all doubts.

<u>7.9-7.0 Good:</u> The context in which the argument is made is presented in a reasonably clear way. The argument is made on a high academic level, but could be more specific. Premises and conclusions could also have been formulated more accurately. Minor flaws in the standardization and premises can be detected. The Toulmin model is used correctly, in the sense that the elements are identified correctly, but the model could have been used better to structure thinking and reasoning. The argument is not entirely self-explanatory and possibly doubtful parts are not sufficiently justified to rectify this.

<u>6.9-6.0 Satisfactory:</u> The reader gets a rough idea about the context of the argument. The complexity of the argument could be higher and the argument (and formulations of premises/conclusions) could be more specific. The standardization and pattern entail some flaws. The Toulmin model is used and its elements are mainly identified correctly, but logical connections are not entirely clear.

5.9-5.5 Pass: The context of the argument is presented, but not very clearly. The argument is not made on a particularly high academic level and premises/conclusions are rather broad. Standardization and pattern entail serious mistakes, but it is still possible to follow the reasoning with some good will. The argument vaguely resembles the Toulmin model and some elements of the model are identified correctly. However, many inferences to not follow logically: the logical structure hardly makes sense.

5.4-0.0 Fail: The context is presented. The academic level and complexity of the argument is very low. It is extremely difficult to follow the reasoning. Standardization & pattern entail major flaws. It is clearly identifiable that the Toulmin model has not been understood.

Appendix: Mock Examination Argumentation II

1. *Make a dictionary for and symbolize the following 5 sentences.*

a. Beethoven's 4th Symphony is neither his loudest nor his longest.
Dictionary

Symbolization

b. If it's German and not Mahler, it must be Wagner.
Dictionary

Symbolization

c. Furtwangler, Von Karajan, and Gardiner are all conductors; still, at least two of them are modest
Dictionary

Symbolization

d. Beethoven's 9th symphony is not both the most famous and the worst symphony.
Dictionary

Symbolization

e. Helmut gets his share of Königsknödel only if he doesn't fall from the mountain, or he gets it if he appears in *Jamie Oliver's Austrian Cooking Adventure*.
Dictionary

Symbolization

2.*Symbolize the following argument, and use a truth table to establish the validity of the argument. If an argument is not valid, give the terms and truth values that show this invalidity.*

If John hits Bernardo then Agneta will be upset. Well, if Agneta is upset then Hans will be happy. But Hans is happy only if it rains. However, it never rains when John hits Bernardo! So either John won't hit Bernardo or Hans will be happy, but not both.

Dictionary & Symbolization (please note that the number of lines is NOT an indication of the exact number of premises!):

Make a Truth Table

Check:

☐Valid

☐ Invalid, for these truth values:

***3**. Symbolize the following Argument, and make a semantic tableau to establish the validity of the argument. If the argument is not valid, give the terms and truth values that show this invalidity.*

If the government rigs the election there will be riots. However, the government will not rig the election only if it is guaranteed victory, and if they don't rig the election then they aren't guaranteed victory. So there will be riots.

Dictionary & Symbolization (please note that the number of lines is NOT an indication of the exact number of premises!):

Make a semantic tableau

Check:

☐ Valid

☐ Invalid, for these truth values: ______________________________