	System 1	System 2
Characteristics		
Advantages		
Disadvantages		

• **Notes:**

1. What is an argument?

2. What is a statement?

3. Do all sentences have truth-value?

4. 'The door is closed' and 'A porta está fechada' express the same:
   - ⚪ statement
   - ⚪ sentence
   - ⚪ proposition

5. Identify the argument (if there are any) in the following passages. If there is an argument, write it in the standard form:

   (a) Abortion is wrong because all human life is sacred.

   (b) While performing an autopsy on a dead sea turtle, Dr. Stacy found shrimp in the turtle's throat. Sea turtles can only catch shrimp if they are stuck in nets with the shrimp. That indicates that the dead sea turtle was probably caught in a net.
   (*Adapted from: Shaila Dewan, "Animal Autopsies in Gulf Yield Mystery," New York Times, Jul 14, 2010, http://www.nytimescom2010/07/15/science/earth/l5necropsy.html*)

   (c) Positron-emission tomography, better known as PET, is a method for examining a person's brain. Before undergoing PET, the patient inhales a gas containing radioactive molecules. The molecules are not dangerous for the patient because they break down within a few minutes, before they can do any damage.
   (*Adapted from: Bryan Kolb and Ian Q. Wishaw, Fundamentals of Human Neuropsychology, 5th ed. (New York: Worth Publishers, 2003), 161*)

(d) The only remaining question was why the man had been murdered. Was it a politically motivated crime or a private one? I thought right away that it must be a privately motivated crime. Political assassins move quickly and flee. But in this case, the murderer's footprints are all over the room, showing that he had spent quite a while in this room.
(Adapted from: Arthur Conan Doyle, a Study in Scarlet (London: Ward Lock & Co., 1988; repr., London: Penguin, 2001), 138.)

(e) It's flu season and you work with kids, so you should get a flu shot.

(f) John will probably receive the next promotion. He's been here the longest.

(g) Descartes exists. After all, if Descartes can doubt that he is thinking, then he thinks. If Descartes cannot doubt that he is thinking, then he thinks. If Descartes doesn't exist, then he does not think.

(h) We must reduce the amount of money we spend on space exploration. Right now, the enemy is launching a massive military buildup, and we need the additional money to purchase military equipment to match the anticipated increase in the enemy's strength

(i) Most people experience no side effects from the yellow fever vaccine. People with egg allergies shouldn't get the yellow fever vaccine, though, because some part of the vaccine is grown inside eggs.
(Adapted from: Division of Vector Borne Infectious Diseases, "Vaccine — CDC Yellow Fever: Centers for Disease Control and Prevention", http://www.cdc.gov/ncidod/dvbid/YellowFever/vaccine/)

(j) There are two ways of settling a dispute: by discussion and by physical force. Since the first way is appropriate for human beings and the second way is appropriate for animals, we must resort to force only when we cannot settle matters by discussion. (*Adapted from: Cicero, De Officiis 11*)

(k) Some people buy college degrees on the internet because they're trying to pretend that they went to college. That's a waste of money, since it's easy to make a college degree on your computer, and a degree that you make yourself is just as good as a degree that you bought on the internet. (*Adapted from: "Fake Degree in Government," The Onion, Oct 18, 2006, http://www.theonion.com/articles/ fake-degree-in-government,15092/*)

(l) It shouldn't surprise anyone that charter schools associated with the public school system perform better that those that operate on their own. Although the public-school bureaucracy can sometimes make it hard to get things done, it also provides invaluable support and services to the charter schools that are associated with it. I don't see why some people are intent on destroying the public-school system. (*Adapted from: Paul Kelleher, letter to the editor, New York Times, Sep 1, 2006, http://query.nytimes.com/gst/fullpage.html?res=9C03E7D81E3F932A3575AC0A9609C8B63*)

Vocabulary:

Sentence letters: A, B, C, …, Z, A$_1$, B$_1$, …, Z$_1$, A$_2$,…,Z$_2$,…

Connectives: ⊃, ∨, ·, ≡, ~

Punctuation: '(', ')', '[', ']'

- Capital letters stand for STATEMENTS

→ WFF or not?

a) (~S ⊃ PQ)

b) [P ⊃ (Q~R)]

c) [~(~P) ⊃ Q]

d) [~([P · Q] ∨ R) ⊃ (P ≡ ~Q)]

e) ~[~P ⊃ (Q ∨ R)]

f) [(P ∨ Q) + ~S]

g) (P)

h) P · Q ∨ R

i) ≡P

Conditional: P ⊃ Q

- Read: if P, then Q

- Stylistic variants:

Order in which antecedent/ consequent appears in a sentence of English	Antecedent/Consequent	Consequent/Antecedent
	if P, Q	Q if P
	provided that P, Q	Q provided that P
	given that P, Q	Q given that P
	in case P, Q	Q in case P
	assuming that P, Q	Q assuming that P
	on the condition that P, Q	Q on the condition that P
	P only if Q	only if Q, P
	P only on the condition that Q	only on the condition that Q, P
	P only given that Q	only given that Q, P

<u>Negation: ~P</u>

- Read: not P

- Stylistic variants:

   * It is not the case that P
   If P means 'John is a student', then the following are stylistic variants:
   * John is not a student
   * John isn't a student
   * John fails to be a student
   * John is other than a student

<u>Conjunction: P · Q</u>

- Read: P and Q

- Stylistic variants:

   * P and Q
   * P even though Q   * Even though Q, P
   * P but Q
   * P although Q   * Although Q, P
   * Both P and Q
   If *P* means *Alfred is a student* and *Q* means *Alfred studies*, then the following are stylistic variants of $P \cdot Q$:
   * Alfred is both a student and studies   * Alfred both is a student and studies
  ** Alfred is a student who studies   ** Alfred is a student that studies
  ** Alfred, who studies, is a student

<u>Disjunction (inclusive): P ∨ Q</u>

- Read: P or Q

- Stylistic variants:

   * P or Q
   * Either P or Q
   * P or else Q
   * Either P or else Q
   * P unless Q   * Unless Q, P
   * P except in the case that Q
   If *P* means *Alfred is a student* and *R* means *Alfred is an administrator*, then the following are stylistic variants of $P \lor Q$:

* Alfred is a student or an administrator.
* Alfred either is a student or is an administrator.
* Alfred is either a student or an administrator.

Biconditional: P ≡ Q

- Read: P if and only if Q

- Stylistic variants:

    * P if and only if Q
    * P iff Q
    * P exactly on the condition that Q
    * P just in case that Q   * Just in case Q, P

Truth-table

- Conditional

P	Q	P ⊃ Q
T	T	**T**
T	F	F
F	T	**T**
F	F	**T**

- Disjunction

P	Q	P ∨ Q
T	T	**T**
T	F	**T**
F	T	**T**
F	F	**F**

- Negation

P	~P
T	F
F	T

- Biconditional

P	Q	P ≡ Q
T	T	**T**
T	F	**F**
F	T	**F**
F	F	**T**

- Conjunction

P	Q	P · Q
T	T	**T**
T	F	**F**
F	T	**F**
F	F	**F**

→ Provide a key and symbolize the following sentences:

1) Ina will not fail to be chosen as campaign manager.

2) Only if Rudolf doesn't lose the Ukrainian vote will he be elected.

3) If Ina is chosen as campaign manager, then Rudolf will be elected if he doesn't lose the Ukrainian vote.

4) It's not the case that if Alfred passes only if the lectures are exciting, then he passes if the lectures are exciting.

5) Alfred is a lover of logic who organizes his time.

6) Ruth is either a logician who enjoys chocolate or a mathematician who craves peanut butter.

7) Ruth will pass if, but only if, she either studies hard or isn't tired.

8) Either Alfred or Kurt, but not both Alonzo and Kurt, orders champagne.

9) Ruth studies hard unless she's tired, in which case she doesn't.

10) Unless either neither Sy nor Nye neigh or Bob and Babs both bray, none of them will beat Whirlaway.

→ Make the truth-table for the following sentences:

1) ~(P ∨ Q) ≡ (~P · ~Q)

2) [(P · Q) ∨ (~P · Q)] ⊃ (P ≡ Q)

3) (P ≡ R) ⊃ [(P ≡ Q) · (Q ≡ R)]

4) (~Q ⊃ ~P) ∨ [P ≡ (P · Q)]

5) (P ⊃ Q) ∨ (Q ⊃ P)