Specific document

"compiler from ASL(American Sign Language) To English"

Introduction:

People who are profoundly deaf can communicate by talking with their hands. You only need your eyesight to know what is being "said". American Sign Language (ASL) is the language of the Deaf in America. Just like in the spoken word, different countries and regions of the world has a different sign language.

How American Sign Language got started is not known, but what we do know is that it was brought to America by a French man named Laurent Clerc who set up the first school for the Deaf here in the US. Clerc taught French Sign Language (FSL) to Americans, and as a result, ASL and FSL are similar, but knowing one does not mean you can understand the other.

American Sign Language is a language that is different from English. It has grammar, punctuation, and sentence structure, as well as how it is used in a particular region as well as common colloquialisms. Each language of sign uses different expressions. In speech, different sounds of tone are used to get a message across. In sign language, body language and facial expressions are used instead of the tones used in speech.

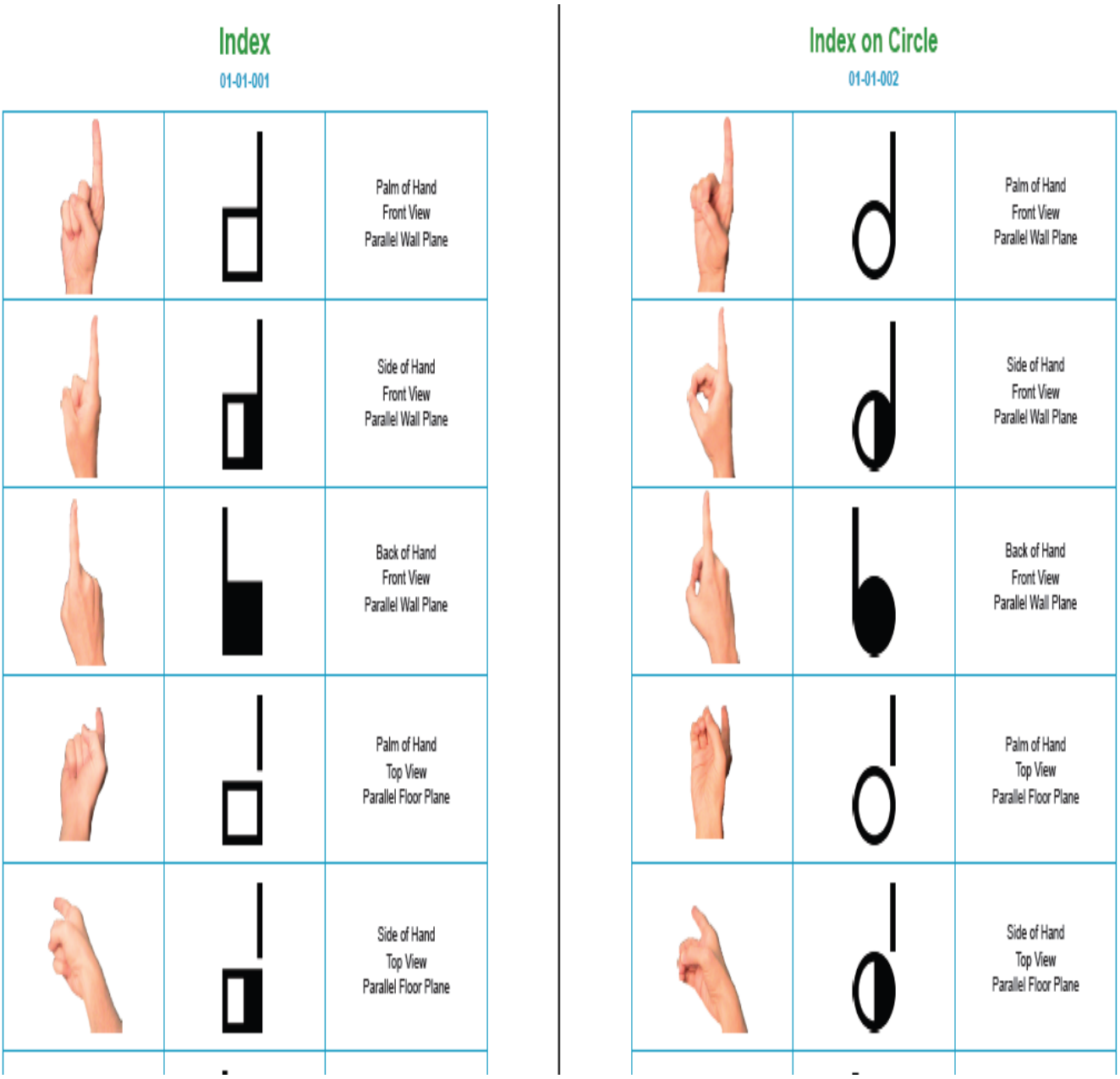
And since the technology has been developed very quick, internet acces that allows us to chat and communicate with others easily, we wanted as group called "GFD" (groupe for deaf) to help deaf people to share this technologies with others: so we thought to create a compiler to convert the signs of ASL to English.

So to put our project in the real life, we chose to look for the syntax and the grammar of this language. And for the tokens we found a dictionary full of those signs. So here is the fruit of work until now. And we want to develop more in the next specific document.

1. Tokens “ASL Dictionary”:

As we mentioned before that ASL needs hands’ movement and facial expressions. So to transform the this movement they chose to create specific symbols to illustrate the head (facial expressions) and hands positions. And here is some pictures that can help us to understand more:

1.1 hands positions:



1.2 Facial expressions

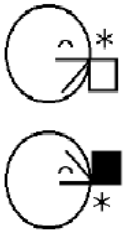
The eyes and the nose

When the focus of a sign is the eyes, or when the point of contact is the eyes or close to them, we write small semi-circles to represent the eyes.

Examples:

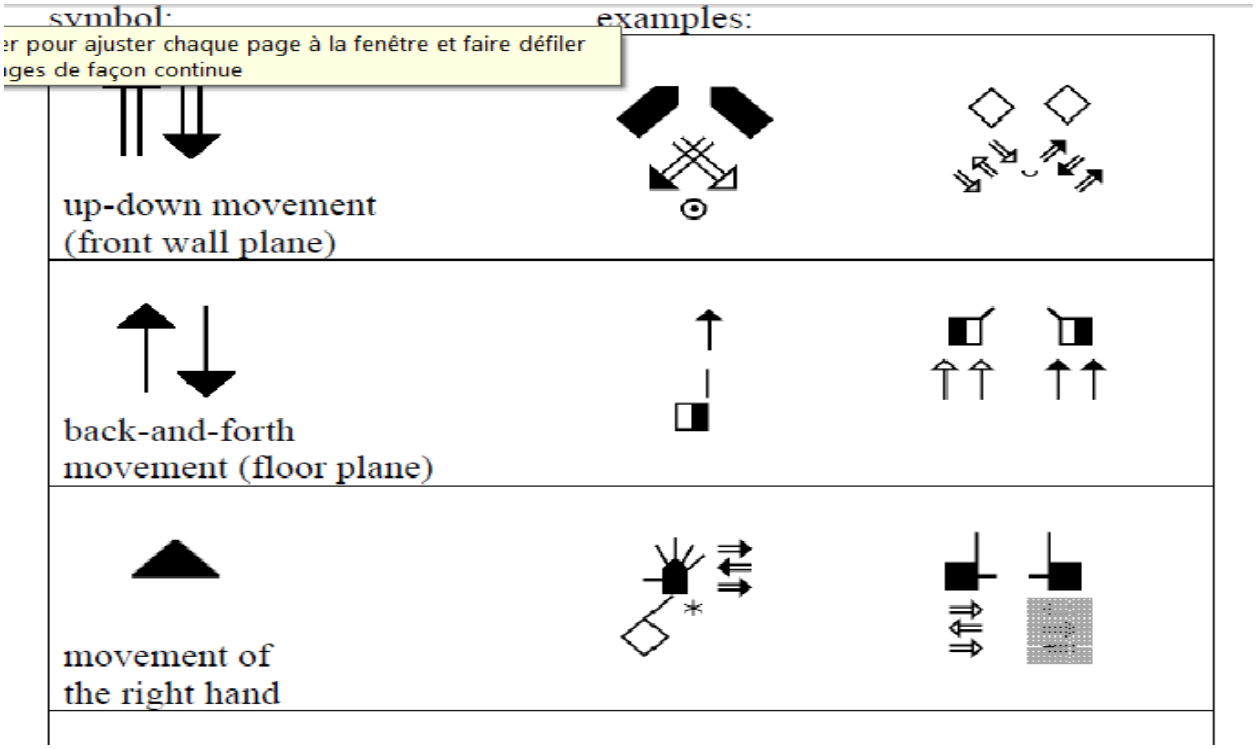
VER
TO SEE

LOS OJOS
EYES

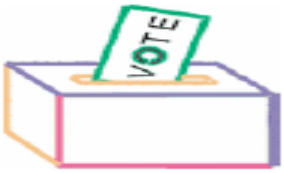
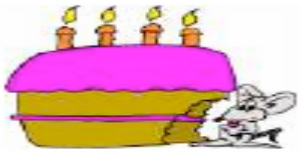
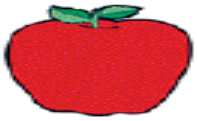
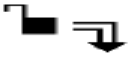


EXPERIENCIA
EXPERIENCE

1.3 movements:



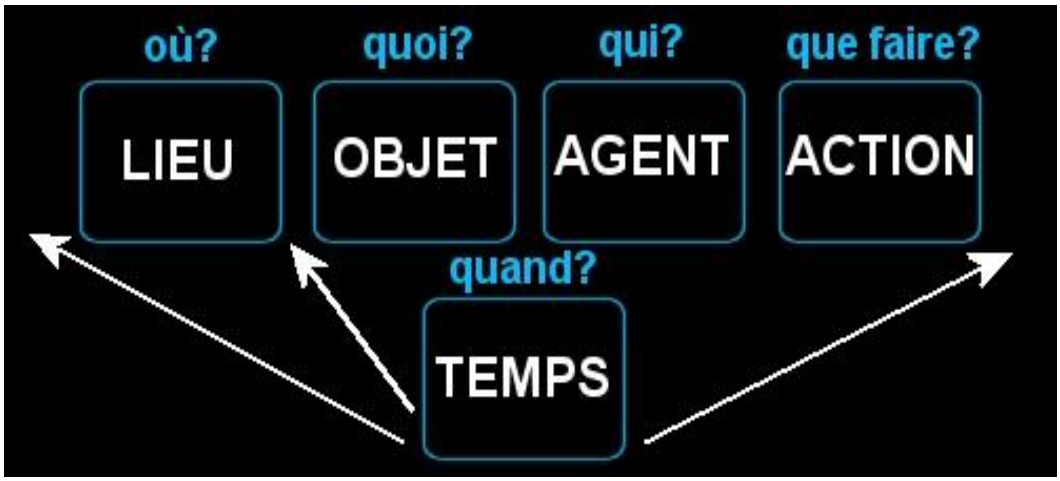
1.4 Dictionary : (examples)

		Disneyland
		D
		democracy
		dessert
		doctor
		apple
		x
		Texas

2. Syntax of the ASL:

The ASL is a separate language, it also has a syntax. The sentences are constructed so a specific order:

We place the place, followed by the Object , then the Subject and finally the action. And knowing The time elements can be placed in several places: at the beginning or end of a sentence or between the place and purpose but never between the characters and action.



From this syntax we can conclude the following rules :

R1 → place object subject action

R2 → time place subject action

R3 → place time object subject action

R4 → place object subject action time

Well this is the grammar that we are going to base on. And we will try to ameliorate it to get LL(1) and we will eliminate the ambiguity.

In fact it is not the only syntax used in the language of signs because In American Sign Language, we have a different syntax. In general, the order of our words in a sentence follows a "TOPIC" "COMMENT" arrangement. This is could also called "subject" + "predicate" sentence structure.

Plus you will often see this structure: "TIME" + "TOPIC" + "COMMENT."

For example:
"WEEK-PAST ME WASH CAR "
or "WEEK-PAST CAR WASH ME "

I personally prefer the first version. Depending on which expert you listen to, you will hear that one way is better than the other. Anyone who tells you that ASL can't use a "subject" + "verb" + "object" sentence structure is simply denying reality. ASL uses SVO quite often. What it doesn't use is "subject" + "be-verb" + "object." For example, in ASL you wouldn't sign the "is" in "HE IS MY BROTHER." You'd simply sign "HE MY BROTHER" while nodding your head. Instead of signing "IS" you nodded your head. "IS" didn't "disappear" it simply took a "non-manual" form. Which is why we say that ASL doesn't use "be verbs." The concept of being and existing are still conveyed--but we do it without "be verbs." Instead we nod our heads, and/or use signs like "HAVE" and "TRUE."

For farther examples we can have those two sentences and their possibilities of signing:

"I am a teacher," could be signed:

1. "I TEACHER I"
2. "I TEACHER"
3. "TEACHER I"

also, "I am from Utah," could be signed:

1. "I FROM UTAH I"
2. "I FROM UTAH"
3. "FROM UTAH I"

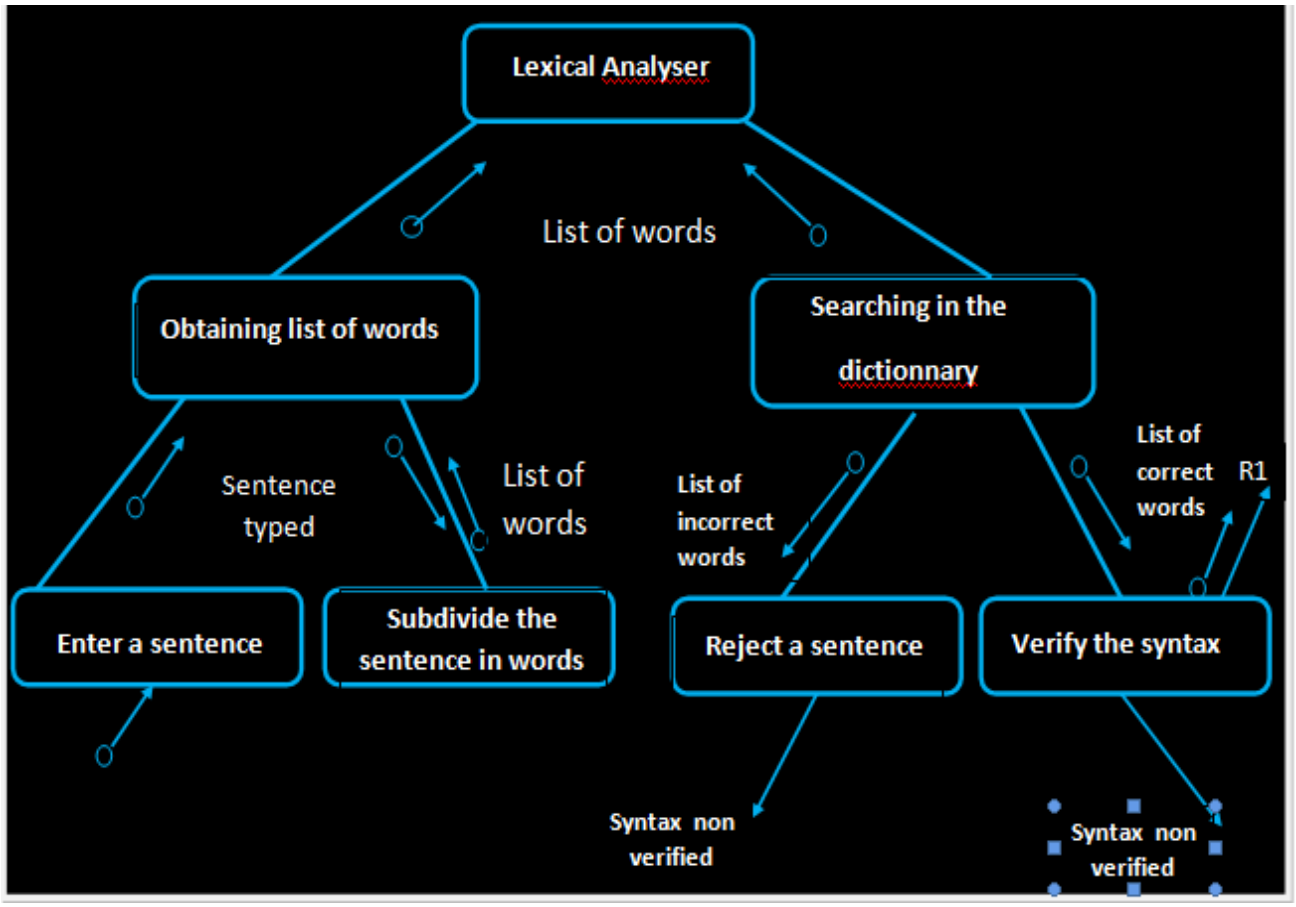
well to be brief all the above examples are correct it depends only on the signers. And what they would like to choose as a form. Because as we mentioned the grammar or the syntax of any language is just common rules shared between a community of people. So in our case we can choose one form and go for it. But we can still include others as special cases. And we have to keep in mind that ASL language does not use the verb be when we want to convert it.

Errors' manager:

Well to be clear. A sentence will not be admitted if it does not follow the order offered by the syntax showed before. For example if we wanna translate the signed sentence:" I FROM MOROCCO" we well verify if the first token is time's token if it is not the case then we will verify if it is a subject if it is not the case the compiler will mension a state of error. So no need to verify the second one.

3. Working approach

The user will type a sentence in the ASL language. The compiler, and under the **lexical analyzer**, will subdivide the sentence to get "tokens" ; each token will be verified using the Dictionary if they exist. If it is the case, then we will stock this token a table to get the order. well this order will be used to compare the rules in the **syntax analyzer**: to verify the rules. And we thought to have a file that stock each category: we mean that we want to stock all the symbols that are related to Time, to Place …etc. so the syntax analyzer will take the first token stocked in the first index of the table and it will go look if this token exists in the file Place if it does not so automatically it is stocked in the Time's file. And if it was not the case then the analyzer will send a message of error saying that this sentence does not fit in this language. And if it was the case I mean the analyzer find it in one of the files then it will pass to the second index till it finish the whole sentence. If all the tokens verify the syntax then we will pass to the semantic analyzer (well we will think about that once we get to study that in the class enchalah) and to explain our ideas clearly her is a graph that shows the steps that we want to follow. (Ri is the the rule number i).



4. Illustrating Example:

here is some examples that we can treat to clarify our idea :

Words	*ASL Signs in order of use*
Hello. Welcome.	Hello. Wecome.
How are you?	How you?
I am fine.	Fine, me.
Who are you?	Who you?
I am ... (name).	Me... (spell name).
Happy to meet you.	Happy meet you.

As you see there is a big different between the natural language and the ASL language. Because the second one is brief, short and to the point. And our job is to mach just the signs to the words to make a good sentence in English. So here are the translation of what we gave as examples:

	
Hello.	Welcome.

As we see in this exemple we just translate what we converted to sign language. Using some pictures but in our case we are going to use specific signs and not drawn ones like in this pics.

	
How	you?

In this example we omitted the verb to be " how **are** you?" we just have to put the question and then the agency directly since there is no action.

	
Fine,	me

In this example we can see that our syntax is respected because we have: le quoi? Which is “fine” and the l’agence which is “me”.

		
Happy	meet	you.

Conclusion

So mainly this language, American Sign Language, came to reduce the English one just help Deaf people to understand others. This language are visual languages used in deaf communities, mainly. They are essentially tempo spatial languages, simultaneously combining shapes, orientations and movements of the hands, as well as non-manual components, e.g., facial expressions. So if we want to get a compiler that convert a signed sentence to the natural one by using the symbols and check this sentences if it respects the rules of the langue’s syntax or not.

And we will give more specification once you valid this document Sir.