Use of Legal Expert System LES-5 in Legal Education

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Contents

1. Introduction

It is an important task for a law professor to educate law students in the skill of legal reasoning. A legal expert system is a computer system,, which entails legal knowledge of lawyers as legal experts in its knowledge base. The legal knowledge involves not only written, explicit knowledge like conventions, statutes, cases, commentaries etc., but also implicit legal knowledge which a lawyer unconsciously possesses and applyies to solve problems legally Examples are legal principles, legal commonsense etc. A legal expert system is a legal reasoning system, which can infer a legal judgment that is to be justified as a result of the application of the relevant legal knowledge to a given case. It can explain the reasoning process to justify the judgment, showing what kind of legal knowledge is to be applied, step-by-step. It can show legal knowledge itself and its logical systematic structure as well. A legal expert system as a legal reasoning system must be, therefore, a useful tool in legal education to teach students law, especially to educate how to reason legally

We have developed several legal expert systems[1]. Recently we have developed Legal Expert System LES-5 in the 'Legal Expert System' Project[2]. This system has been applied experimentally to legal education at Meiji Gakuin University Faculty of Law and Keio University Faculty of Law in Japan. We believe in the usefulness of the system for legal education.

For purposes of this presentation, I would like to talk according to the above contents. In the second chapter, which follows the present introduction , we would like to afford a legal theoretical basis for LES-aided Legal Instruction, especially to clarify the following: what is legal reasoning? In the third chapter, we would like to explain an example of legal reasoning by showing the problem and its solution. Fourth, we introduce you to our Legal Expert System LES-5 and show how the system explains the reasoning to solve the problem. Fifth, we would like to discuss how one might use the Legal Expert System LES-5 to educate law students, according to our teaching experience.

2. Legal theoretical basis for Legal Expert System LES-5

In order to use a legal expert system for legal education efficiently and correctly, or, in other words, in order to make such a legal expert system itself in advance, which can be used efficiently and correctly for legal education, it is necessary for us to understand its legal theoretical basis. For, only when we understand the theory of the law, which can analyze the law and legal reasoning precisely; can we simulate the legal reasoning on the computer system and explain to students the reasoning for using the system correctly.

We have developed a legal theory called **Logical Jurisprudence** to analyze the law in terms of logic and to construct

1 *LES-1 (1983), LES-2 (1986), LES-3 (1992) and LES-4 (1995).*

2 'Legal Expert' Project is a Japanese project on development of legal expert system, which has been funded by the Japanese Ministry of Education, Science and Culture. The author, as the representative, organized lawyers and computer scientists for "Legal Expert Project" to clarify legal knowledge and develop legal expert systems (1993-1998). As regards the project itself and its study results, cf.: two special issues of for the Legal Expert Project *Journal of Advanced Computational Intelligence* Vol1, No.2 1997; Vol.2 No.1 1998. At the present, we are performing a study project on LES-aided Legal Instruction System.

legal reasoning systems on its basis. Logical Jurisprudence tries to constitute the world of legal discourse in terms of the smallest unit of primitives. It starts from three primitives: **sentence**, **validity** of sentence, and **inference rule**. Logical Jurisprudence attempts to explain or model the law using these three notions as far as possible.

Here we would like to explain mainly what legal reasoning is, from the point of view of Logical Jurisprudence. Legal reasoning is a process of the development of legal sentences. In other words, legal sentences are developed in the process of legal reasoning. The general structure of legal reasoning is to be expressed in **Figure 1**. Legal reasoning is constituted of two types of reasoning, which are connected with each other: reasoning of justification and reasoning of discovery.

Reasoning of legal justification is reasoning through which a judgment is justified from previously justified legal knowledge. Logical deduction is the type of reasoning in legal justification. The logical structure of this reasoning is Modus Ponens.

$(A \Rightarrow B), A \Rightarrow B$

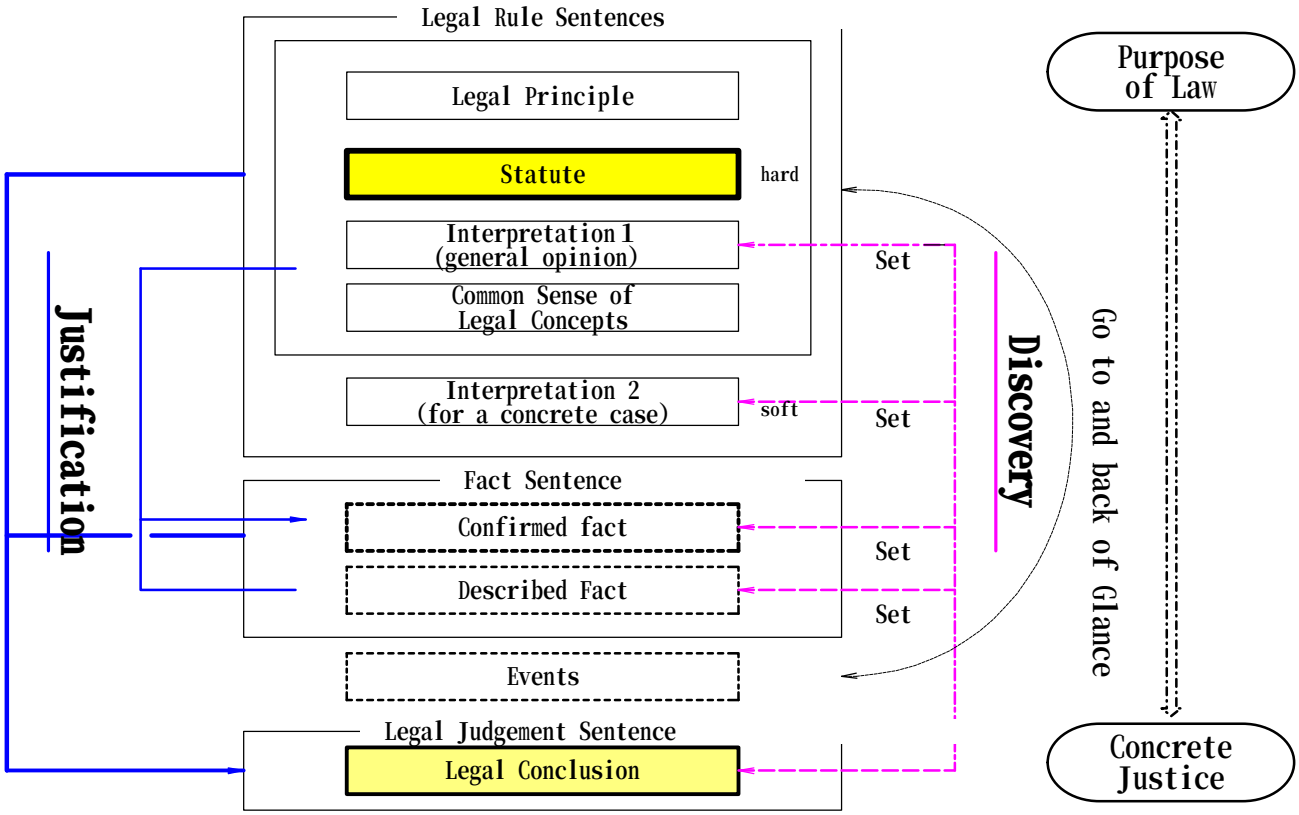
A judgment may not be deduced from statutes and facts alone, but it may be shown that it is deduced from the whole body of legal knowledge, including statutes, facts and additional legal sentences like implicit legal common sense or as a result of the reasoning of legal discovery. Following, are such additional legal sentences: Principles of law that unify statutory legal sentences; common sense about legal terms, especially hierarchical relations between legal concepts; and the proposition of interpretation of statutes that are created by the reasoning of legal discovery

Reasoning of legal discovery is reasoning through which judgments themselves or additional legal sentences are discovered or created. This reasoning is related to logical deduction because discovered legal sentences are to be set so that the judgment can be justified as a conclusion of logical deduction on the one hand. It is related to deduction because the discovery is to be performed through a falsification inference on the other. Falsification has the logical structure of Modus Tollens:

$(A \Rightarrow B), \neg B \Rightarrow \neg A$

The reasoning of legal discovery, however, requires something more than deduction. To get hypothesis A in the schema above, abductive or inductive reasoning is needed.

Figure 1: Legal Reasoning Structure



Reasoning to get a hypothetical fact sentence is abduction and reasoning to generate a rule is induction.

Reasoning of legal discovery of rules is performed in two directions: (1) concretization[3] and (2) systematization[4]. In concretization, lawyer must discover concrete meaning of terms of legal text to set concrete sentences which represent it, in order that the text is applied to solve a concrete case. Legal interpretation or analogy is a reasoning of concretization. In systematization, it is important to discover legal principle sentences, which will enable us to bring mere collections of legal sentences into a system.

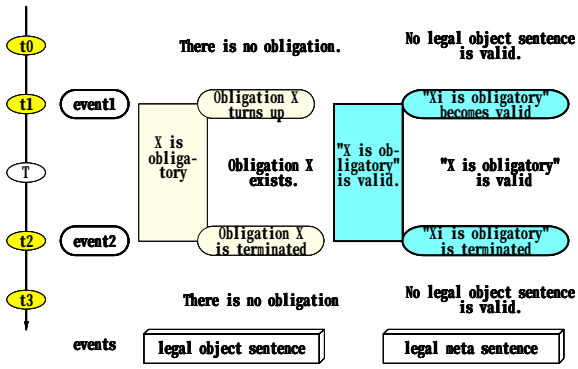
To construct a legal expert system, the deductive structure of law must be clarified to make a deductive knowledge base, where a decision can be shown as a conclusion of logical deduction from the knowledge. It has long been desired in legal studies to clarify the deductive system of law and to systematize legal knowledge[5]. On the basis of Logical Jurisprudence, we have succeeded in systematizing the law of contracts as a logical deductive system[6] and building a knowledge base on the United Nations Convention on Contracts for the International Sale of Goods (CISG), leaving the reasoning of legal discovery to another time[7].

In order to systematize the law, Logical Jurisprudence starts from three couples of basic concepts of legal sentences: fact sentences and rule sentences, element sentences and compound sentences and object sentences and meta sentences. We analyze and systematize the law in terms of these three concepts

Here I would like to explain about the last concepts, i.e. object sentence and meta- sentence. A **legal object sentence** describes the object itself. In the legal domain, the object is an "obligation". Legal object sentences prescribe the obligations for a person. The sentence "Bernard must pay Anzai the price of $50,000" is a legal object sentence. A **legal meta- sentence** prescribes legal sentences. More precisely, it prescribes the validity of a legal sentence. An example of a legal meta- sentence is: "A contract is concluded at the moment when an acceptance of an offer becomes effective." (Article 23, CISG) or "The buyer may declare the contract avoided, if the failure by the seller to perform any of his obligations under the contract or this Convention amounts to a fundamental breach of contract" (Article 49 (1) (a), CISG).

Law ultimately prescribes the obligation of persons. In other words, people's conduct is ultimately regulated by obligations given them by law. What legal obligations exist depend on the legal sentences that describe the obligations, or more precisely, on the validity of legal object sentences. The validity of legal object sentences is prescribed by legal meta- sentences. In Logical Jurisprudence, the existence of A's obligation to do Z means that "A has an obligation to do Z" or "It is obligatory for A to do Z" is valid. The relation of the existence of an obligation and the validity of a legal object sentence describing the obligation are shown in **Figure 2**.

Figure 2: The Existence of an Obligation and the validity of the object legal sentence



It is to be noted that legal sentences describing rights are not legal object sentences, which describe obligations. They do not belong to an object level of legal language but a meta- level. Logical Jurisprudence takes the sentences, which describe rights, as a kind of legal meta-rule sentence, which make it possible to set forth a new legal object sentence.

3. Problem and its solution – an example of legal reasoning

This chapter describes an example problem of a dispute relevant to CISG, presents queries on the problem, citation of the relevant legal texts and introduces legal solutions to questions so that the goals of legal reasoning, which are to be solved also by means of LES, are identified in advance.

[Case 8f]

(1) On April 1, a New York maker of agricultural machines, A (Anzai), dispatched a letter of a proposal to a Hamburg branch of a Japanese trading company B (Bernard). The content of the letter was:
A sells B a set of agricultural machines which is composed of a tractor and a rake and the price of the tractor is $50000; A delivers the agricultural machinery to B by May 10, B must pay

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[3] Cf. Ref. 15)
[4] Cf. Ref. 7)
[5] Cf. Ref. 4)
[6] Interesting books on law and legal reasoning modeling have been published[2,5,and6]. Our study developed independently of them. Our approach is different from van Kralingen's approach, for example, in that it is not a conceptual or frame-based, but purely logical, especially in that we analyze and reconstruct the law intensively in 'legal sentences', 'their validity' and 'logical deduction'.
[7] We have already done this to in a certain extent, i.e. ref.15)

the price of the system of the agricultural machine to A by May 20 and the agricultural machinery will be carried by an American freight vessel.

(2) The proposal reached B's letterbox on April 8. On April 9, B made a telephone call to A.

(3) "The offer is accepted." Then B said to A. “I would like to withdraw my offer.”

(4) On May 1, A finally handed the farming machine over to a Japanese container ship at the port of New York.

(5) On May 31, the machine was delivered to the branch office in Hamburg.

(6) On June 5, B examined the machine.

(7) On May 10 B paid the price of $50,000 to A.

(8) On August 10, the machine proved to be operating out of order because of a faulty connection gear.

(9) B immediately notified a specifying the nature of the problem.

(10) On September 1, B asked A to repair the problem within one month.

(11) A did not remedy the lack of conformity by repair by October 1.

(10) On October 10, B declared the contract void.

(11) On December 10, A recovered damages and B restituted the machine delivered by A.

(12) On December 20, A restitutes the price paid by B.

The following questions are set as examples.

[Question]

At each of the points in time below, what are the legal relation that exists between A and B?

1: April 5th

2: April 15th

3: May 5th

4: August 15th

5: September 15th

6: October 5th

7: November 15th

8: December 15th

9: December 25th

The following CISG articles apply:

Article 15

(1) An offer becomes effective when it reaches the offeree.

(2) An offer, even if it is irrevocable, may be withdrawn if the withdrawal reaches the offeree before or at the same time as the offer.

Article 16

(1) Until a contract is concluded an offer may be revoked if the revocation reaches the offeree before he has dispatched an acceptance.

Article 18

(2) An acceptance of an offer becomes effective at the moment the indication of assent reaches the offeror. . . . .

Article 23

A contract is concluded at the moment an acceptance of an offer becomes effective in accordance with the provisions of this Convention.

Article 31

If the seller is not bound to deliver the goods at any other particular place, his obligation to deliver consists:

(a) If the contract of sale involves carriage of the goods - in handing the goods over to the first carrier for transmission to the buyer;

Article 38

(1) The buyer must examine the goods, or cause them to be examined; within as short a period as is practicable in the circumstances.

Article 39

(1) The buyer loses the right to rely on a lack of conformity of the goods if he does not give notice to the seller specifying the nature of the lack of conformity within a reasonable time after he has discovered it or ought to have discovered it.

Article 45

(1) If the seller fails to perform any of his obligations under the contract or this Convention, the buyer may:

(a) exercise the rights provided in articles 46 to 52;

(b) claim damages as provided in articles 74 to 77.

(2) The buyer is not deprived of any right he may have to claim damages by exercising his right to other remedies.

Article 46

(1) The buyer may require performance by the seller of his obligations unless the buyer has resorted to a remedy, which is inconsistent with this requirement.

(2) If the goods do not conform with the contract, the buyer may require delivery of substitute goods only if the lack of conformity constitutes a fundamental breach of contract and a request for substitute goods is made either in conjunction with notice given under article 39 or within a reasonable time thereafter.

(3) If the goods do not conform to the contract, the buyer may require the seller to remedy the lack of conformity by repair, unless this is unreasonable having regard to all the circumstances. A request for repair must be made either in conjunction with notice given under article 39 or within a reasonable time thereafter.

Article 47

(1) The buyer may fix an additional period of reasonable length for performance by the seller of his obligations.
Article 49
(1) The buyer may declare the contract avoided:
(a) if the failure by the seller to perform any of his obligations under the contract or this Convention amounts to a fundamental breach of contract; or
(b) in case of non-delivery, if the seller does not deliver the goods within the additional period of time fixed by the buyer in accordance with paragraph (1) of article 47 or declares that he will not deliver within the period so fixed.

[Solution]

1) On April 5th, there is no legal relation between the seller A and the buyer B.
2) On April 15th, A has a duty to deliver the farming machine to B by May 10 and B has a duty to pay the price $50,000 to A by May 20th, while B has right to require A to deliver the goods to B and A has the right to require B to pay the price to A by May 10th.
3) On May 5th, B has a duty to pay the price $50,000 to A by 20 May, while A has right to require B to pay the price to A by 10 May.
4) On August 15th, A has a duty to recover the damage, while B has right to claim from A the damage and B has right to require A to repair the machine.
5) On September 15th, A has a duty to recover the damage and a duty to repair the machine, while B has right to claim from A the damage and B has the right to require A to repair the machine which is restricted to exercise.
6) On October 5th, A has a duty to recover the damage and a duty to repair the machine, while B has right to claim from A the damage, B has right to require A to repair the machine and B has a right to declare the contract avoided.
7) On November 15th, A has the duty to recover the damage and the duty to restitute the price paid by B, and B has the duty to restitute the machine delivered by A, while B has the right to claim damage from A and the right to require A to restitute the price, and A has the right to require B to restitute the machine.
8) On December 15th, A has the duty to restitute the price paid by B, while B has the right to require A to restitute the price.
9) On December 25th, there is no legal relation between A and B on the contract.

The changes of legal relationships according to the time progress of the event in case 8f are shown in **Figure3**. The above solutions correspond to obligation and right. In this chart, the existence of legal relations is indicated by the rectangle zones of the validity of legal sentences, which describe obligations and rights in the figure. The legal knowledge which enabling deduction of the above solutions, or in other words, enabling the formation of rectangle zones of legal relations in the Figure 3 is to be learned by students.

4. Legal Expert System LES-5

We have developed several legal expert systems. They are legal reasoning systems on the contract law, especially on the CISG. They have knowledge bases of the CISG, which are made on the basis of Logical Jurisprudence. The main parts of the developed systems perform reasoning of legal justification. Our first Legal Expert System was LES-4. LES4 system is a system to support knowledge base construction, which has a knowledge editor to develop the knowledge base more easily and efficiently as well as and a debugger to check the correctness of the knowledge base. LES5 system is made so that a user can use it to know the results of the application of the law to concrete cases and their reasoning through a WWW browser via the Internet. Any user can use the system insofar as his computer has a browser and is connected to a LAN or Internet. LES4 and LES5 can be used being connected with each other.

The LES5 system is composed of an HTTP server, Inference gateway (CGI program), servers with inference engines and main machine interface (**Figure 6**). The inference engine is a meta-interpreter written in Prolog to perform CPF (Compound Predicate Formula, which is the knowledge representation language for LES invented by us[8]) directly. A CPF rule file, a goal file and board numbers of socket are given in it at the beginning and it is permanently stationed after starting. The meta-interpreter is called for requirements from the process on network through socket communication and it can return the results of the inference. The inference engine is separated from the CGI program (gateway) and the inter-face is composed of socket communication, so that the independence of the programs is promoted. The program source is written in SICStus prolog, so that it is valid independently on special platforms.

I would like to introduce you to this legal expert system, showing pages of the system and explanations of the pages. The system has a Japanese version as well as an English version. **Figure 7** is the Homepage of Hajime Yoshino Online. From here, we can access to the home page of "Legal Expert System Project" **(Figure 8).** By choosing "Legal Expert System", the LES-5 menu is open **(Figure 9**) Here, we can choose the law to be applied, theories on the law, which are depending on authors and also choose the consulting case. In the Figure we have selected the CISG with Yoshino's theory and Case 8f. We may preview the chosen case, modify it or create a new case. **Figure 10** shows an outline of the chosen Case 8f, which was described above in this paper. In the LES-5 menu, if we click 'Do Inference', we are given the 'inference' page (**Figure 11**), where we may select the "goal list" approach or the "Legal Figure of the Case" approach to let the system perform the inference.

If one selects the "goal list" approach, then **Figure 12** is turned out, where a list of goals, which should be solved by the system, is

[8] 26)

shown. In Figure 12, the goals to be solved are the validity of the legal sentences at each time given in query. If we choose here "is_valid_04_15", which means what kind of legal sentence is valid on April 15, for example, then the system performs the inference to find what kind of legal sentences are proven as valid at the time point in order to confirm the state of legal relationships at the time point. **Figure 13** shows that the sentence "It is obligatory for Anzai that Anzai delivers Bernard goods 'agricultural machinery' is valid at time Aril 15" and this is because the sentence "It is obligatory for Anzai that Anzai delivers Bernard goods 'agricultural machinery' has become valid at the time of April 9 and it is not proved that the sentence has been terminated in the mean time. This is a result of the application of Rule number 0, which represents fundamental meta-rule (mr1). If one clicks "<0 >"of the "[APPLIED RULE] <0>" in Figure 13, then the window changes to **Figure 14**, which shows the rule 0 itself[9]. The first sentence under "BECAUSE" of the Figure 13 is the proved requirement of the rule 0 of Figure 14. If one clicks in this way each of the proved requirements (which are displayed below the "BECAUSE"), one can further follow the basis for the proof of the requirement. For example, as we have clicked the first proved legal requirement, which is directly below the "BECAUSE" in Figure 13, **Figure 15** has come out. As we have clicked the proved requirement of Figure 15, **Figure 16** has come out. Figure 16 is the result of the application of the rule 011, which is a meta rule regulating the relation between validity of an element sentence of a contract as a complex sentence and the validity of the contract itself (**Figure 17**). If one clicks the first requirement of Figure 16, which represents that a contract between A an B became valid on April 9, then **Figure 18** comes on. The figure shows that the contract becomes valid on April 9, because it is concluded on April 9. It is the result of the application of the rule 3AA1B regulating 'become valid' of a contract in connection with the formation (conclusion) of the contact (**Figure 19**). If one asks why the contract is concluded on April 9 clicking the relevant sentence in the Figure 18, which is the proved requirement of the rule 3AA1B, then **Figure 20** comes on. Figure 20 shows that the contract is concluded on April 9, because A's offer of the contract become effective on April 8 and B's acceptance of the offer becomes effective on April 9, which is the result of the application of the rule 2a1 (**Figure 21**). If one click the proved first requirement of the rule "Anzai's offer to Bernard becomes effective at time April 8", which is shown directly under "BECAUSE" of the Figure 20, then **Figure 22** comes on, which shows "Anzai's offer becomes effective on April 8 because it reaches offeree Bernard on April 8. If one clicks here "<fact c7a2>, then **Figure 23** comes on, which shows the relevant fact sentence, which proves the above requirement. In this way one can look for the basis of legal reasoning according to the logical structure of legal knowledge up to the final corresponding facts. If one would like to look for the reason why "Bernard's acceptance with minor modification becomes effective at time April 9" in Figure 20, then one should click the relevant proved requirement in the Figure, so that **Figure 22** comes on. The process to explain the reason is identical to the process above.

If we choose the "Legal Figure of the Case" approach in Figure 11, then the system will display a chronological figure of the legal relationships between the parties, which are represented as the validity of the legal sentences that describe the legal right and duty relationships between parties (**Figure 25a**; **Figure 25b** and **Figure 25c**). If we click any sentence in chronological figures, which represents one legal relationship, then the system shows the basis for the proof that the sentence is valid. For example, in Figure 22a, if we click the legal sentence "It is obligatory for Anzai that Anzai delivers Bernard goods "agricultural machinery", then **Figure 26** displays the beginning point and ending point of the validity of the legal sentence[10]. This figure shows that the sentence "It is obligatory for Anzai that Anzai delivers Bernard goods 'agricultural machinery'" becomes valid at the time point April 9 and it is terminated at the time May 1. One can look for the reason why the sentence becomes valid or is terminated by clicking the Begin date "4/5" or End date "5/1". For example, if we click the former, then **Figure 27** comes on, which is the same as Figure 16. The further explanation process of the basis of the proof is to be performed in the same way as above described[11].

5. Use of LES-5 in legal education

Law students should learn how to reason legally, as above mentioned. The general structure of legal reasoning to get a legal decision as an application of law to a given concrete case is shown in Figure 1 above. Students should learn reasoning of legal justification as well as reasoning of legal discovery. How is the Legal Exert System LES-5 useful for students to learn these two types of legal reasoning? That is to be discussed here.

It is to be noted at first that Legal Expert System LES-5 can perform reasoning of legal justification precisely as far as the relevant legal knowledge for the given case is installed in the system in advance. The goal of legal reasoning in the field of the substantive law is to decide the state of legal relationships, namely to decide what kind of duties or rights exist for the parties at a certain time point of a given case. It is an important task for a lawyer, especially for a judge, to infer the state of legal relationships, which come out as a result of application of the relevant laws to concrete cases, and justify his judgment as a reasonable conclusion based on correct inference. This is especially the case in civil law countries.

[9] The "Validity" button of each page is designed to show the basis for proving the validity of the applied rule to the case, which is still under construction.

[10] This figure corresponds to rule <0> which is referred to above.

[11] Here we have to confess that this chronological figure of the relationship is not automatically produced yet, but it is theoretically possible to make an automatic system, which displays that kind of figure, if we are not concerned about its beauty or efficiency.

Law students should learn to infer the legal state of legal relationships as a result of the application of the relevant laws to concrete cases and to show or write the justification reason of his judgment. The present legal reasoning system LES-5, which infers the state of legal relationships as deductive conclusion from law and the facts of a case and shows clearly the deduction process, is, therefore, a useful tool for the students to learn this legal reasoning of justification. .

The present system has the capability to show the legal knowledge in its details on the one hand and systematically on the other hand, especially in terms of relationships between the legal requirements and legal effects in each legal rule, and in terms of relationship between legal rules including meta-levels of rules. The system is, therefore, useful for law students to know or understand legal knowledge in its details and the systematic structure of the knowledge. (The system would be useful also for law professors to analyze legal knowledge in their favored fields and to develop their individual systematization of knowledge.) For two years, we have experimentally used the LES-5 in two classes at Meiji Gakuin University Faculty of Law and Keio University Faculty of Law for students to learn the knowledge of contract law and to exercise reasoning of legal justification in the field. We have found that LES-5 is useful for students especially to understand the structure of law and the legal justification process. As the system is available through Internet, it will be a useful tool also for legal distance learning.

It is also to be noted that LES-5 cannot perform any reasoning of legal discovery by itself. The reasoning of legal discovery is very important for legal praxis. Legal reasoning of discovery is performed to get the decision itself as a hypothetical at first and to find or create additional legal knowledge (rules), which intermediate between statutory rules and confirmed facts[12]. The systematization and realization of reasoning of legal discovery on a computer platform is difficult task for AI studies. No reasoning system of legal discovery has been developed yet such that might be useful for legal training.

The LES-5 cannot directly deal with reasoning of legal discovery. But the system could help students indirectly to learn the reasoning of discovery. It is to be noted that the system can show the reasoning process of legal justification very precisely and the applied knowledge in details. By means of the system, students can identify where and what kind legal knowledge was discovered or created to intermediate between knowledge or between knowledge and facts in order that the present justification came[13]. Students could then check the appropriateness of the added knowledge. They could replace the knowledge with other knowledge already created by lawyers and let the system infer to check the result of the application of the knowledge. Or, they may create new knowledge for themselves. At the moment, these are our expectations of the use of LES-5 for legal education.

We need, of course, to have a legal reasoning system which can perform reasoning of legal discovery. We are now analyzing this type of legal reasoning intensively. The construction of a legal expert system for legal discovery and its use for legal education is our near future task.

[12] The reasoning of discovery of the facts is here ignored.

[13] Students must learn to discover concretized sentences from a legal text toward a concrete case on the one hand and they must learn to discover legal principles, which systematize legal rules, on the other hand. In order to find these additional sentences, students must learn the logical structure of this justification process precisely. Only if students know this justification process well, they can conceive what kind of sentences (legal knowledge) are set or to be set here newly.

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Demonstration of LES-5

(Switch to Netscape Navigator !)

Figure 7

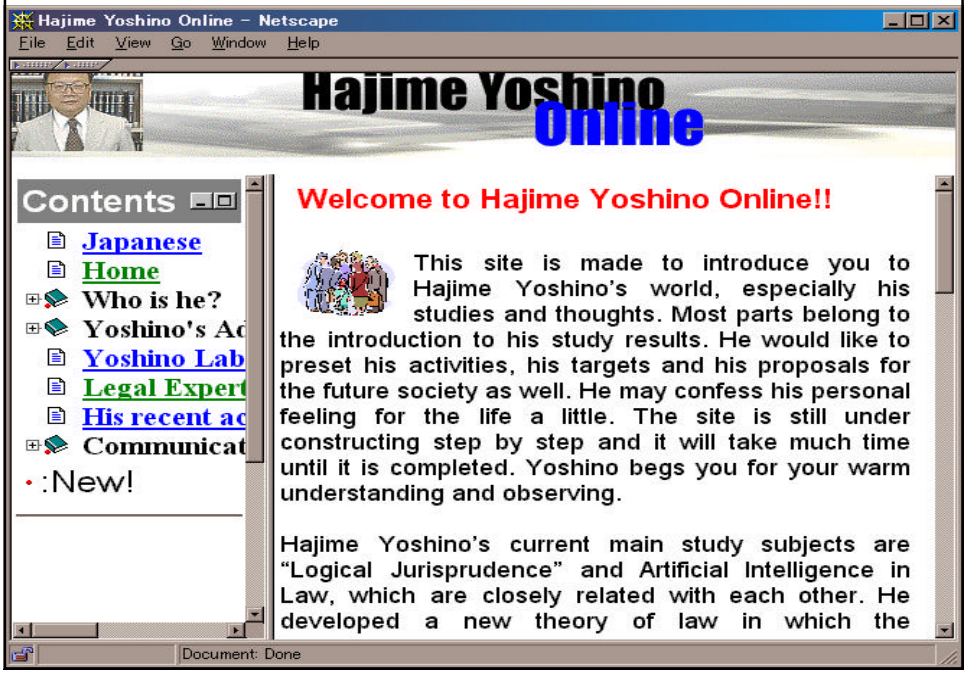
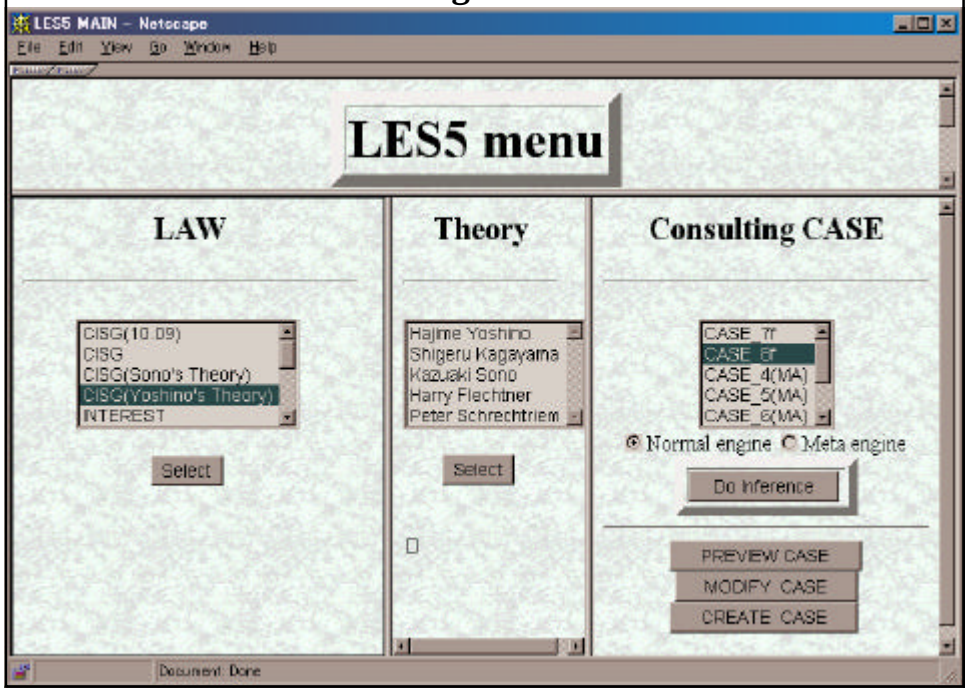


Figure 8

Figure 9



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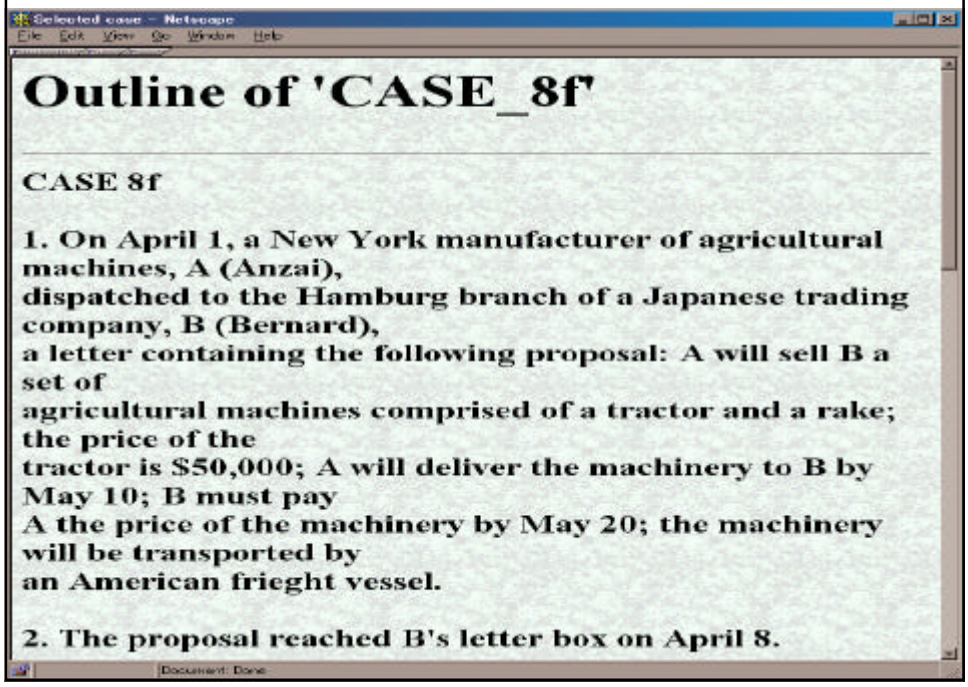

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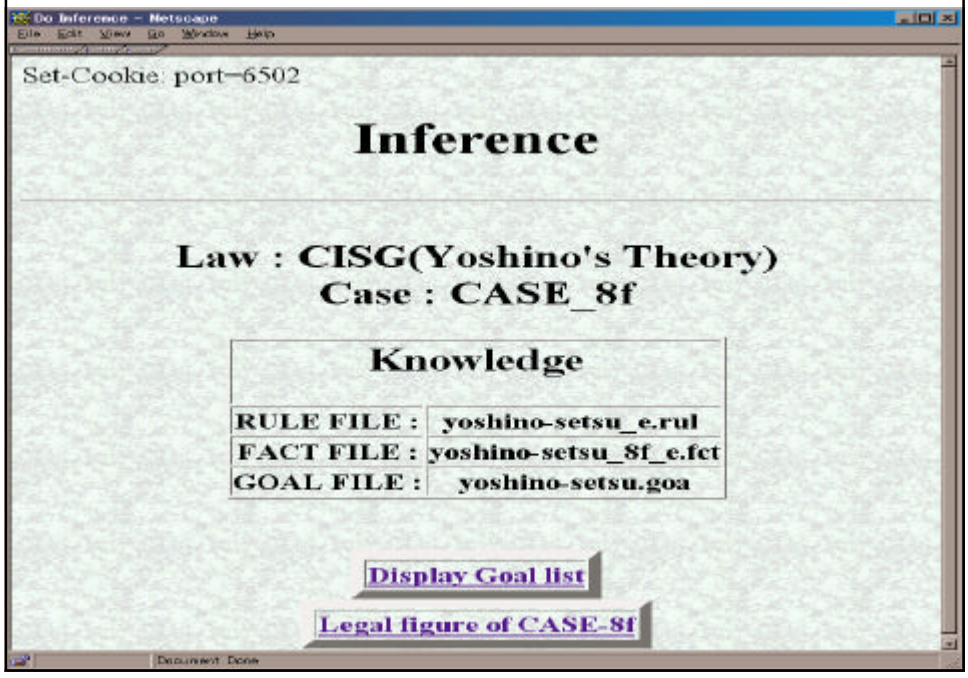

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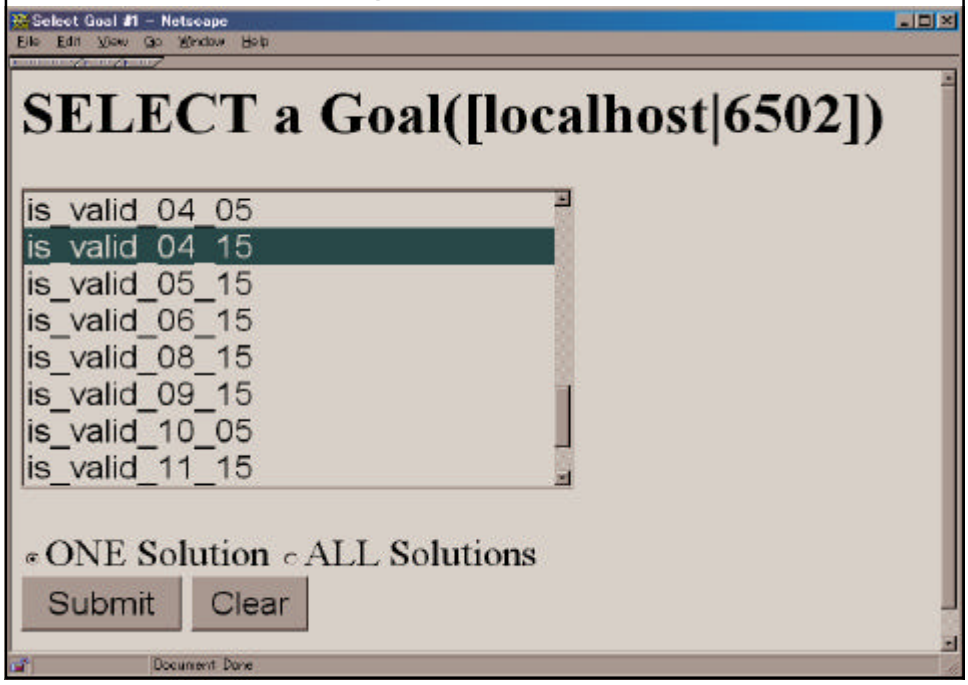

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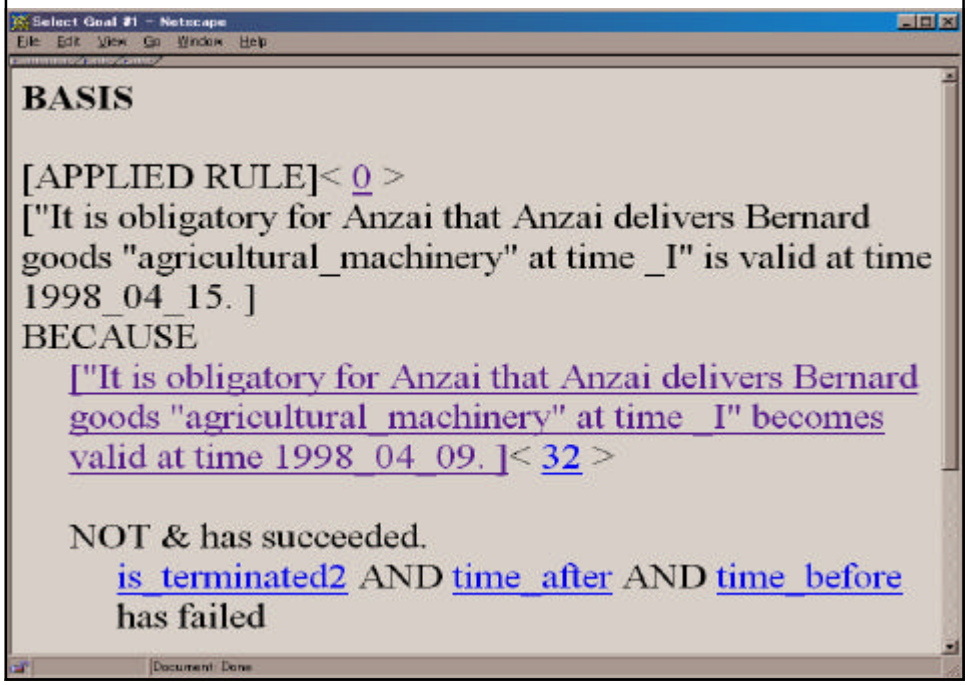

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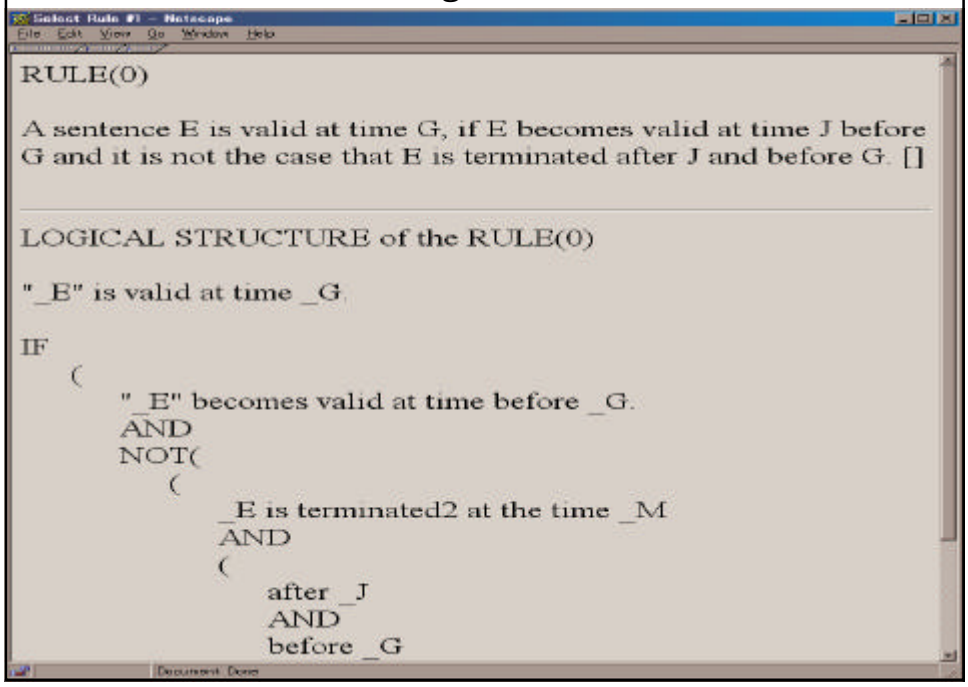

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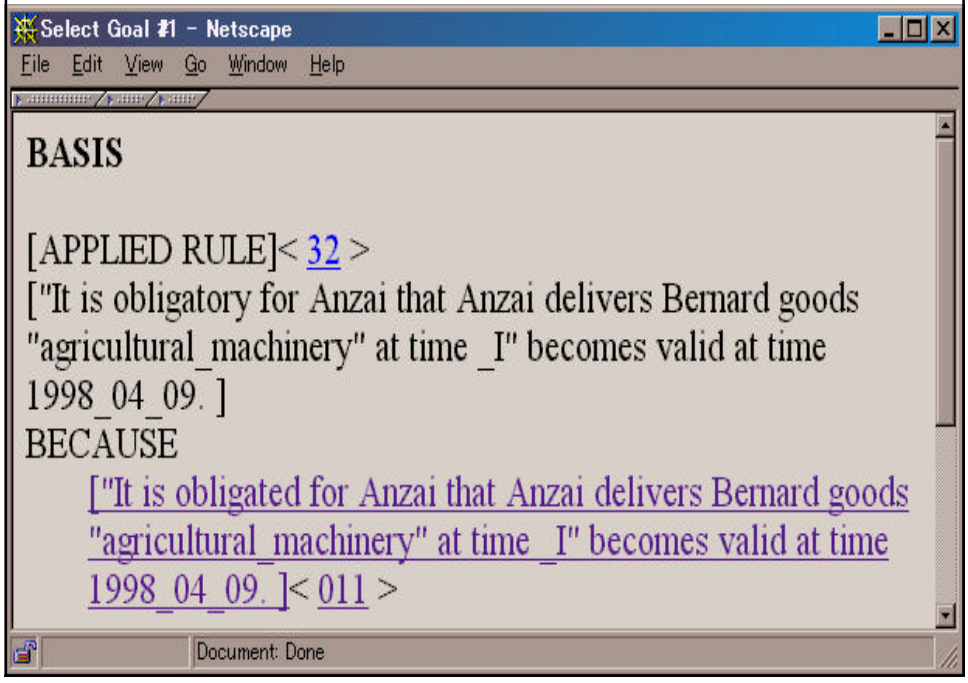

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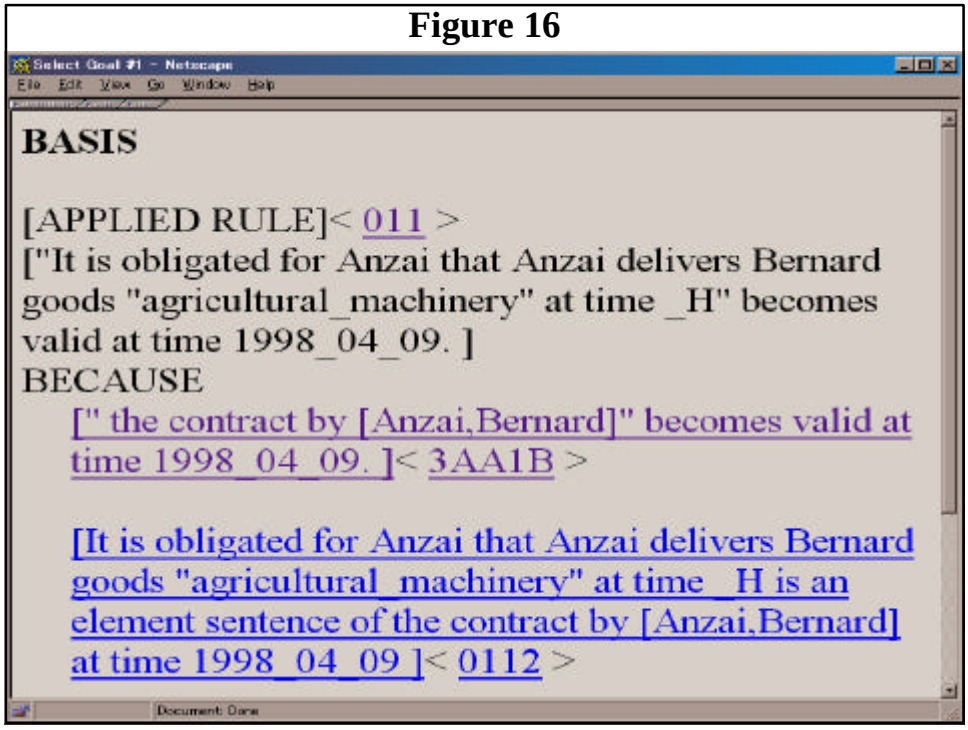

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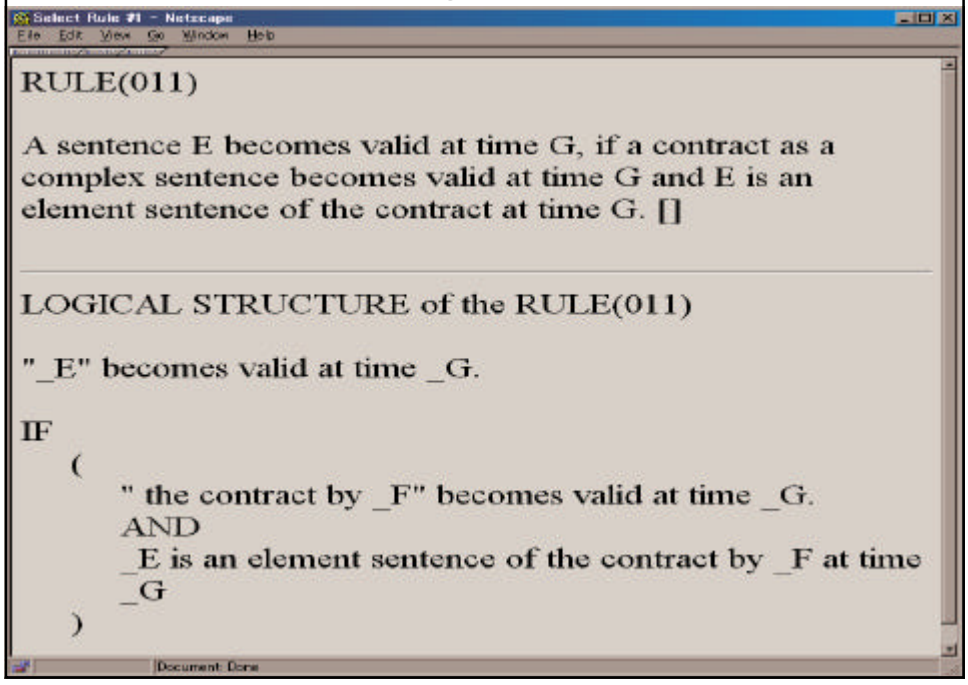

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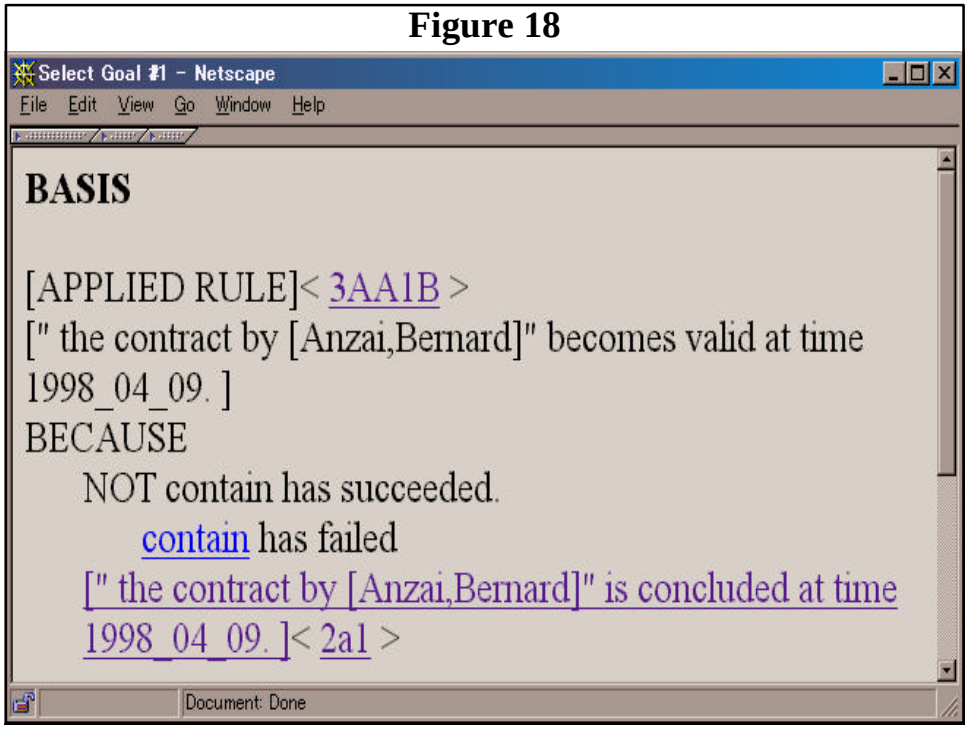

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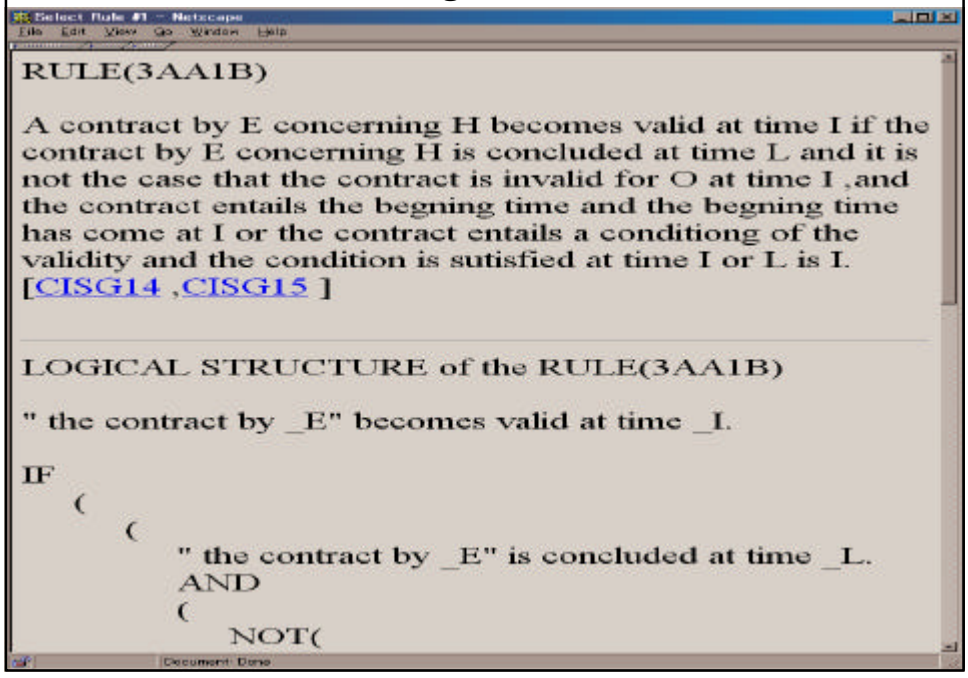

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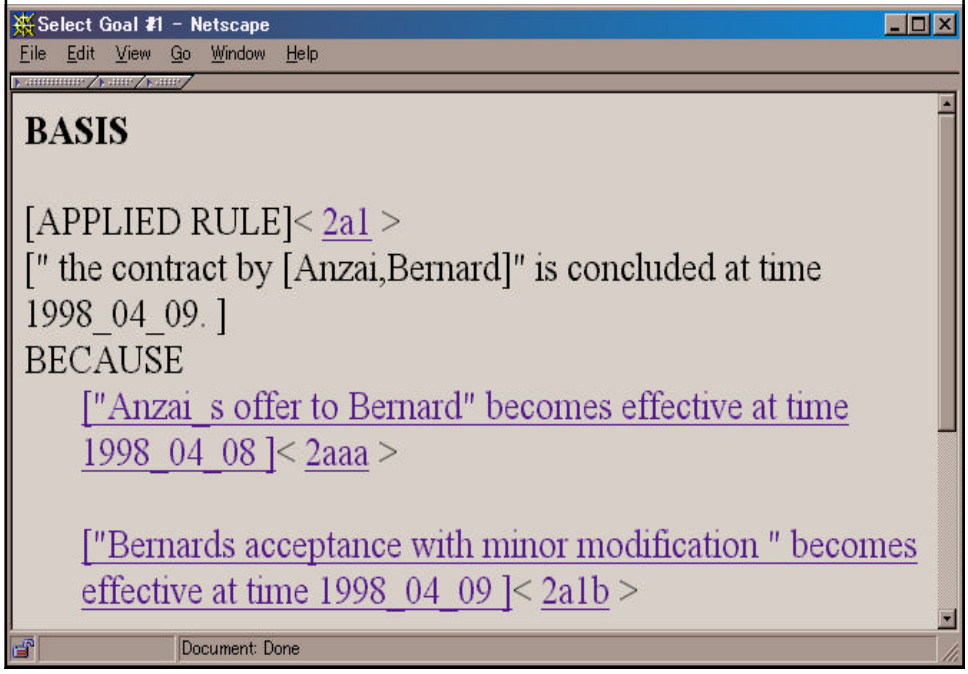

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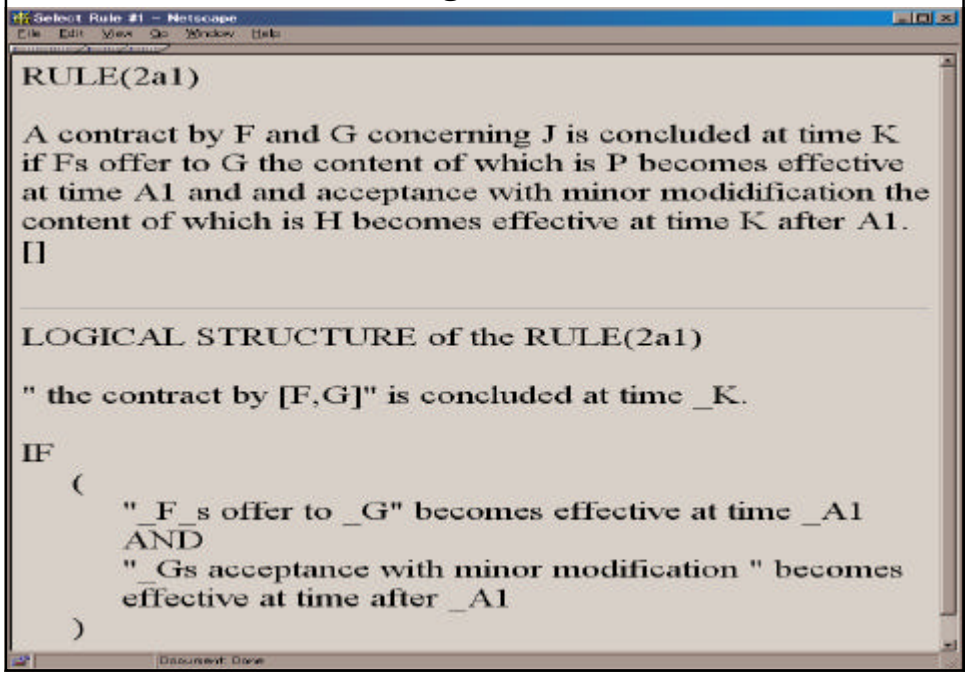

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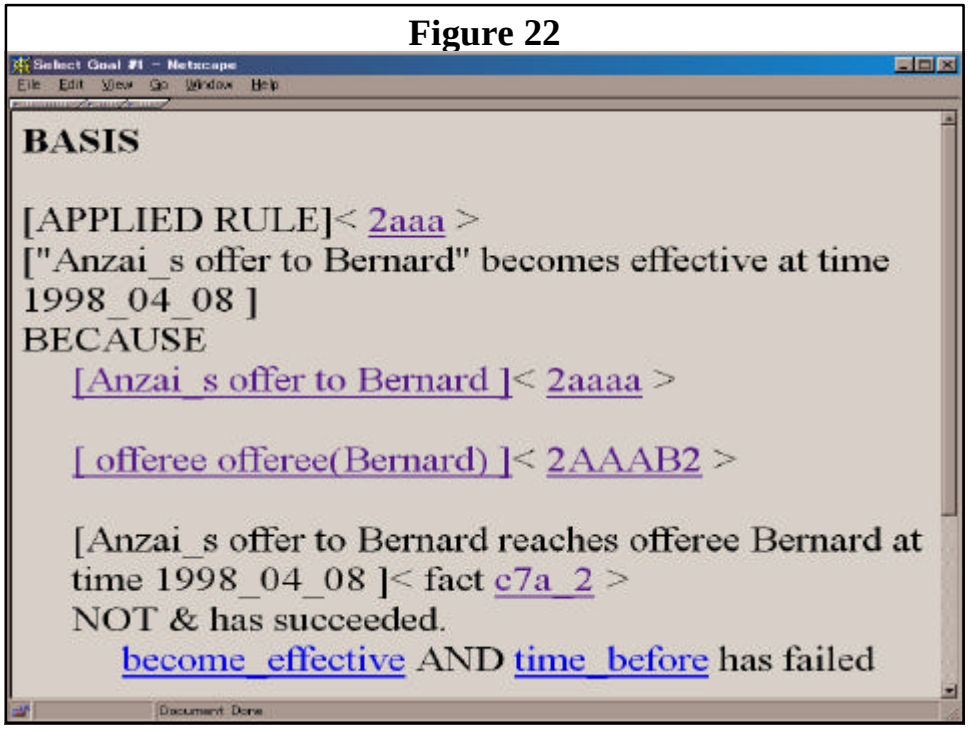

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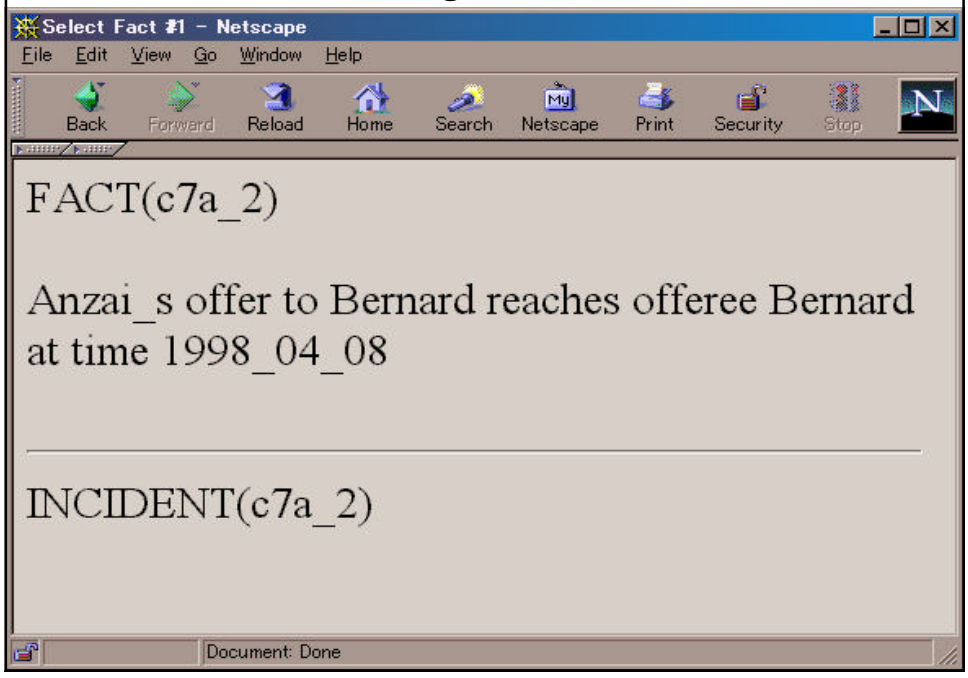

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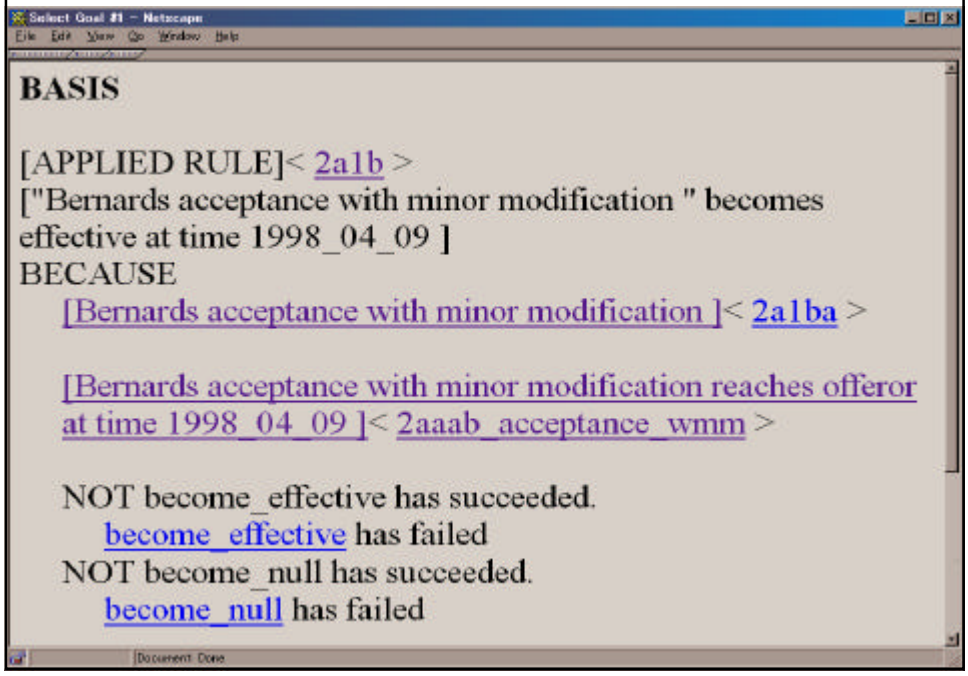

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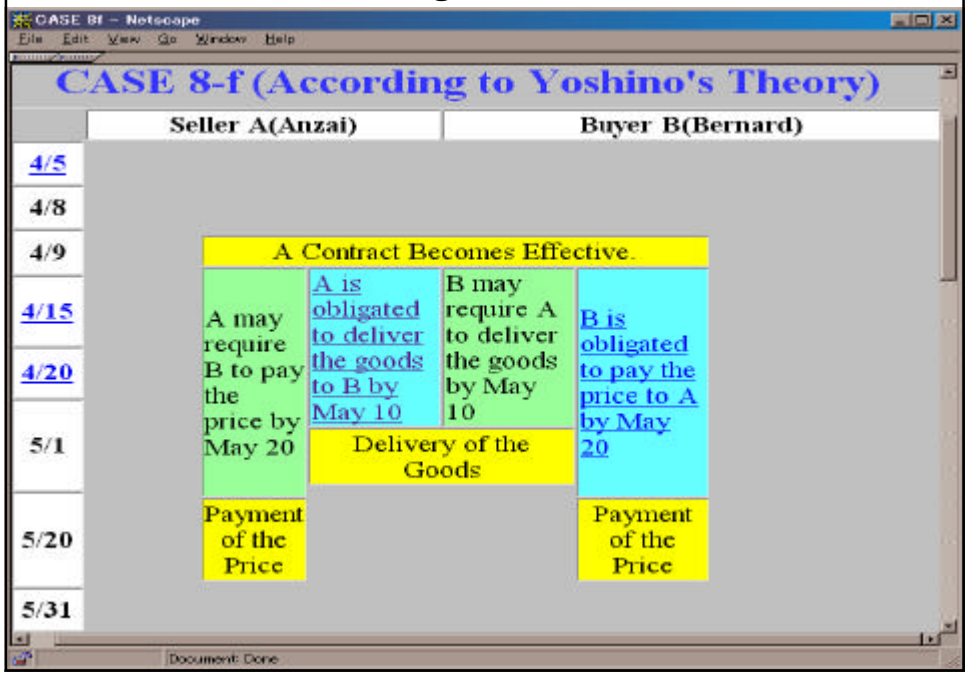

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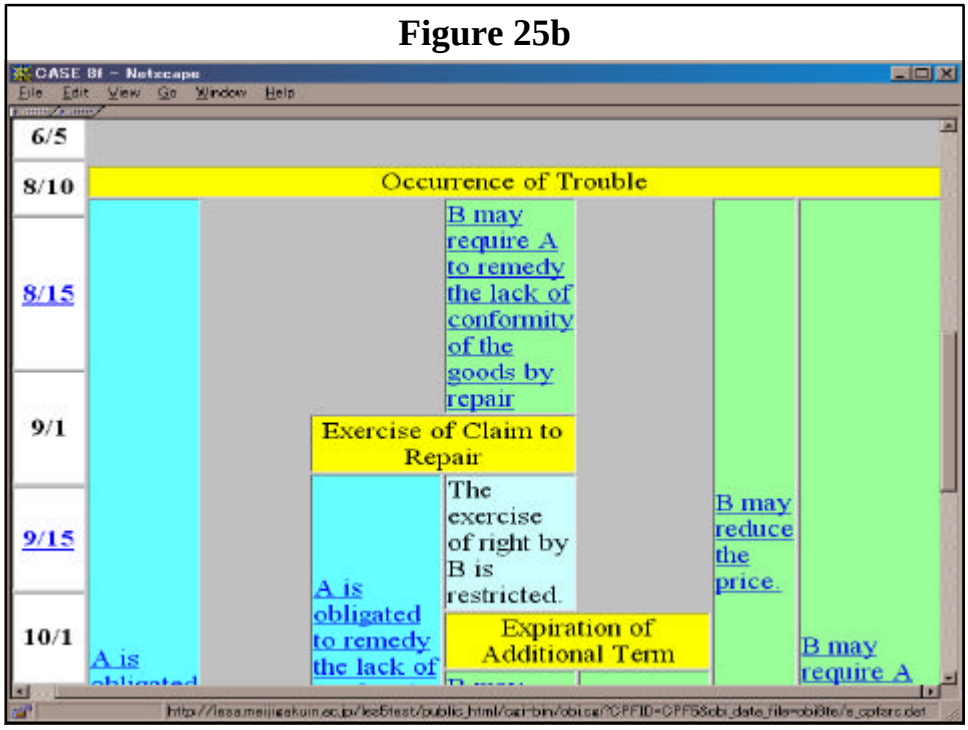

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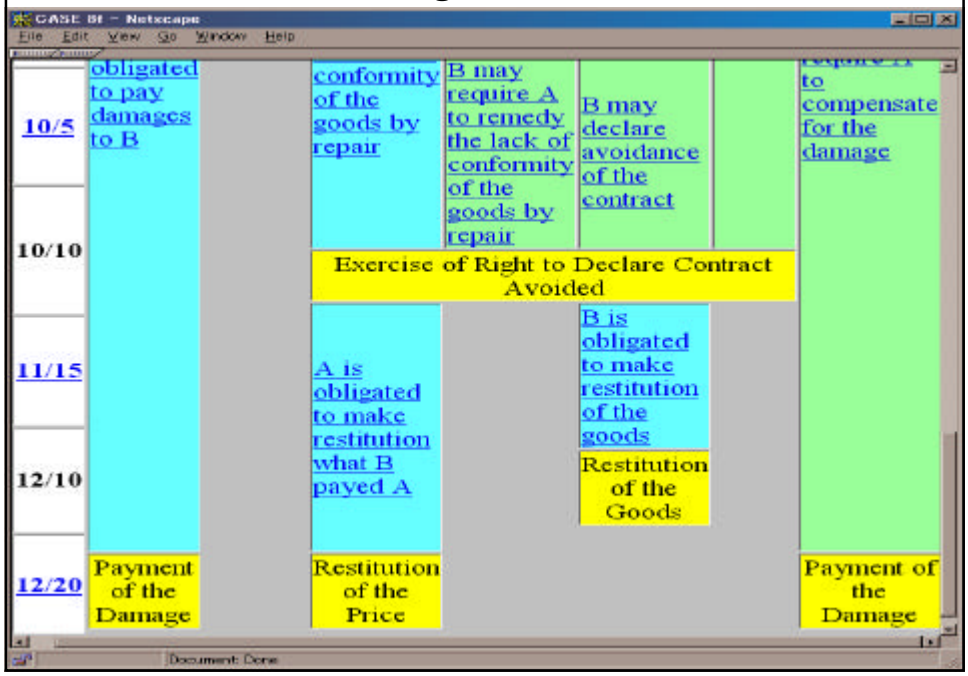

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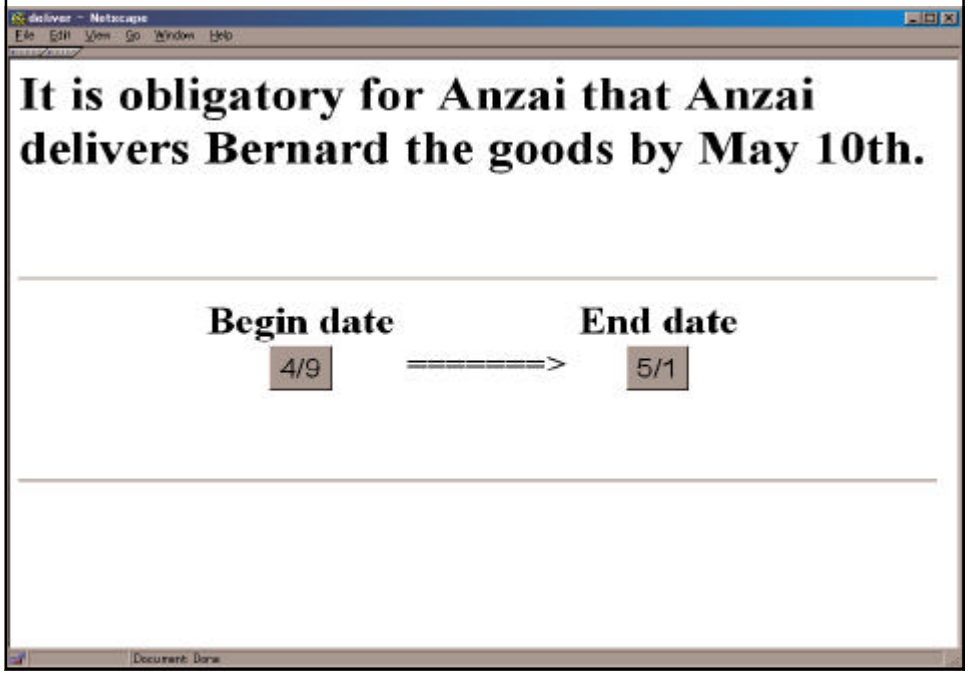

Figure 27