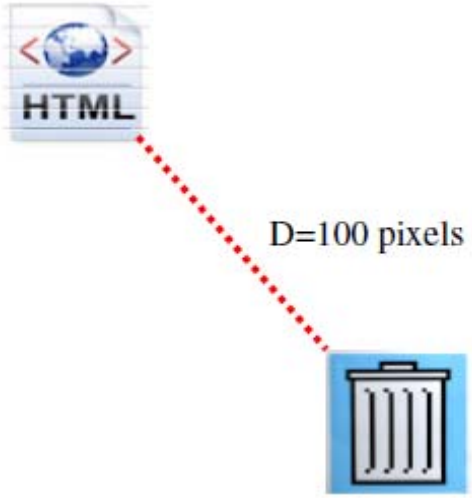
MILITARY COLLEGE OF SIGNALS
FINAL EXAM SOLUTION
BESE 14 – (A & B)
CSE 476 Human Computer Interfacing

Instructor: A/P Dr. Imran Siddiqi

Time: 150 Minutes
Max Marks: 50

(3+3+3)

1. a. An HTML file icon is to be dragged to the trashcan icon as indicated in the figure below. Both the icons are squares of 10 pixels and the two icons are separated by a distance (corner to corner) of 100 pixels. Applying Fitt's law, predict the time required to move the file icon to the trashcan. You may assume a value of 1 for the constants in Fitt's law.



Response time as per Fitt's law:

$$T = a + b \log_2 (D/S+1)$$

S= Target size
D= center to center distance

Each icon is a square of 10 pixels.
Distance from corner of icon to its center: sqrt (5^2+5^2) = 7.07
Total distance between the centers of two icons: 100 + 2*7.07 = 114.4.
S (along axis of motion) = 7.07

$T=1+ \log_2 (114.4/7.07+1)$

b. List some of the challenges/difficulties in using handwriting recognition for text input to the computer. Is online recognition easier than recognizing the text written on paper? If yes/no can you elaborate why?

Challenges in handwriting recognition:

- Segmentation of characters
- Different writing styles
- Interpretation of individual characters

Online handwriting recognition is easier as compared to offline text as we also have the additional stroke order and timing information in online text while offline text just presents the final shape of the character.

c. What is *Page Description Language* (PDL) and why is it useful. Give an example of a PDL.

Page description language contains a description of the page instead of the actual contents e.g. iinstructions for curves, lines, text in different styles, etc. It is like a programming language for printing and reduces considerably the amount of data to be sent to the printer. The most common PDL is the PostScript.

(4+4)

2. a. Differentiate between *Internationalization* and *Localization*. List some of the challenges associated with *Internationalization*.

Internationalization is the process of designing a software so that it can be easily adapted to various languages and cultures without design changes.

Localization is the process of adapting an internationalized software for a specific region or language by adding local-specific components and translation.

Challenges:

Language: Translation, catering different scripts, text direction, writing conventions
Culture: Colors, metaphors for icons etc.

b. You have designed a dialog box which will be part of a software that is to be released in English, French and Spanish. The dialog box has only two buttons and the respective variables in your program are: *button1, button2*. The buttons will have the following text in different versions:

	English	French	Spanish
button1	Yes	Oui	Si
button2	No	Non	No

i. Show the three message files for this dialog box?
ii. Assuming that functions for specifying the message file name, setting the button text and getting a value from the message file are available; show how would you use them in the source code of your dialog.

MessageFiles

English

Button1 = Yes
Button2 = No

French

Button1 = Oui
Button2 = Non

Spanish

Button1 = Si
Button2 = No

Assuming that the software is to be released in English:

```
msgFile.setName("English")
String b1 = msgFile.getString("Button1")
String b2 = msgFile.getString("Button2")

Button1.setText(b1)
Button2.setText(b2)
```

(3+2+3)

3. a. List two presentation issues which you need to address while designing user support (help) systems. Give an example of *Command Assistance* and a *Wizard*.

Two main presentation issues in user support systems are:

How help is requested> button, icon, command
How help is displayed > same window, split window etc.

Command Assistance: help java
Wizard: MS resume wizard

b. How the *JSD Diagram* of a system differs from its *hierarchical task analysis*?

Both are pretty much similar however in JSD diagrams we have to follow the strict left to right sequence while the sequence in HTA is determined by Plans. There are additional notations for optional and repetitive tasks in JSD diagrams while both these aspects are catered again by Plans in HTA.

c. Perform a *hierarchical task analysis* of making a call to a friend using your cell phone.

The solution is not unique. One possibility could be:

0. Make a call
1. Get Phone
2. Unlock Phone
    a. Press Unlock button
    b. Press *
3. Make call
    a. Search Number
        i. Search number in phonebook
        ii. Search number in call log
    b. Dial Number
        i. Press OK
        ii. Wait for response
        iii. Talk
4. End call

(3+4+3)

4. a. List any five of Nielsen's Heuristics for usability evaluation.

Visibility of system status
Match with real world
Consistency and standards
Error prevention
Flexibility and efficiency
Help and documentation

b. Your developers have provided you with an interface and you need to evaluate whether a font size of 8, 10 or 12 in your menu items would make the selection easier for the users. Using empirical evaluation, state the dependent and independent variables, the hypothesis, the experimental design and the way you will actually carry out the evaluation.

IV: Font Size
DV: Number of errors/ time to complete a task
Hypothesis: Increasing the font size will reduce the number of errors
Design: With-in Subjects/Between subjects (as per your choice)
Process: Design three interfaces with everything same except the font size which varies from 8 to 12. Ask the participants to perform some task that involves clicking the menu items. Note the

number of errors (time taken) and analyzing the number of errors against each of the font sizes approve or disprove the hypothesis.

c. What is the difference between client side and server side dynamic web pages? Give two example technologies of each category.

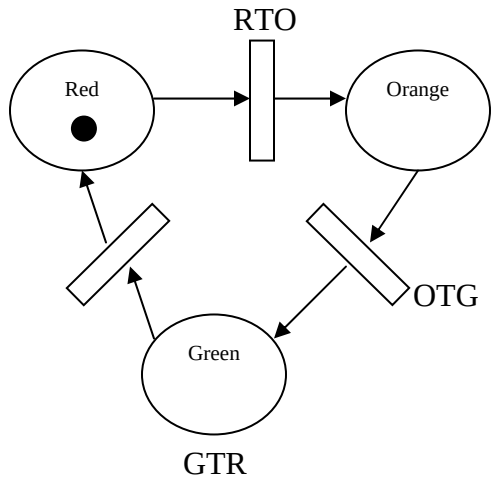
The dynamic content in client side dynamic pages is generated on the client machine. The server sends the requested files along with an instruction file that is executed on the client machine. On the other hand in server side dynamic pages, the dynamic content is generated on the server and the resulting file is sent to the client machine.

Examples

Client Side: Java Script, VB Script
Server Side : ASP.NET JSP , PHP

(4+3+4+4)

5. a. Design a Petri net for a traffic signal where the lights follow the following sequence: Green – Orange – Red – Green. Assign meaningful names to places and transitions and assume that the signal is initially Red.

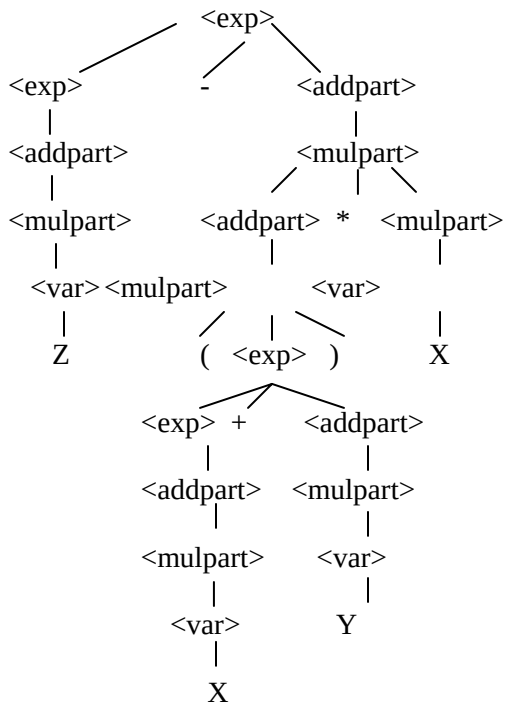


b. Propose a BNF that allows you to generate real numbers. Examples may include number like 0.5, 2.34, 54.65 etc.

<real>::= <int> . <frac>
<int>::= <digit> | <digit><int>
<frac>::= <digit> | <digit><int>
<digit>::= 0|1|2|3|4|5|6|7|8|9

c. Is the expression “z - (x + y)*x” a valid string according to the following BNF:

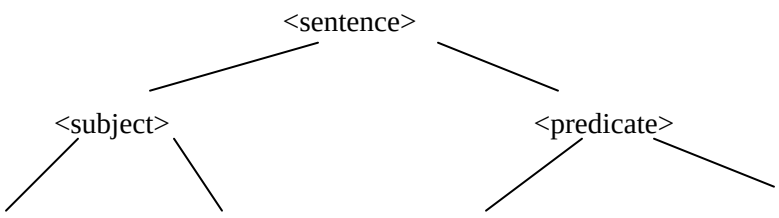
<exp> ::= <exp> + <addpart> | <exp> - <addpart> | <addpart>
<addpart> ::= <addpart> * <mulpart> | <mulpart>
<mulpart> ::= <var> | (<exp>)
<var> ::= x | y | z

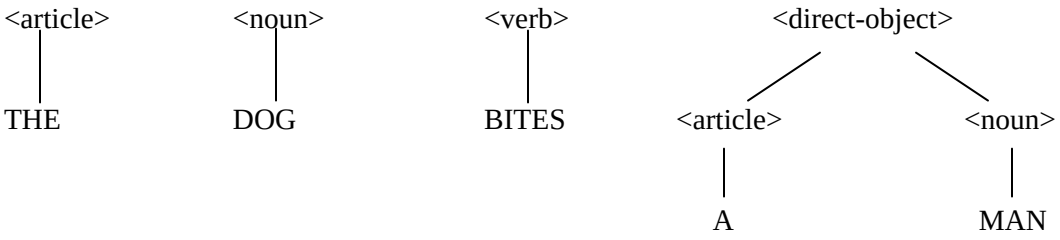


The given string is valid according to the grammar.

d. Consider the following grammar:
<sentence> ::= <subject> <predicate>
<subject> ::= <article> <noun>
<predicate> ::= <verb> <direct-object>
<direct-object> ::= <article> <noun>
<article> ::= THE | A
<noun> ::= MAN | DOG
<verb> ::= BITES | PETS

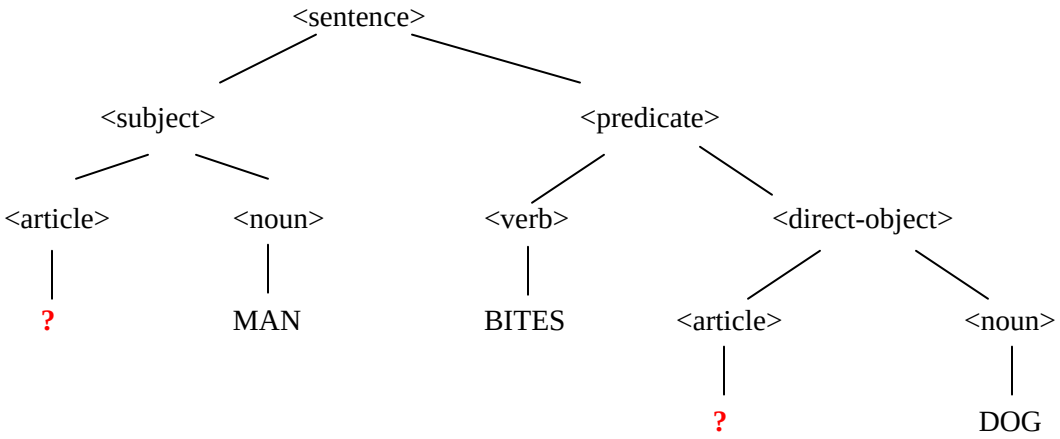
THE DOG BITES A MAN





Valid String

MAN BITES DOG



Invalid String

========= Bon courage ☺ ==========