

# CS193I Final

**Closed Book, Closed Notes  
2 8x11 Cheat Sheets  
Calculator okay – NO computer.  
(Total time = 180 minutes)**

Name (*please print*): \_\_\_\_\_

**I agree to abide by the terms of the Honor Code while taking this exam.**

Signature: \_\_\_\_\_

*Score*

1. (30) \_\_\_\_\_

2. (40) \_\_\_\_\_

3. (35) \_\_\_\_\_

4. (35) \_\_\_\_\_

5. (40) \_\_\_\_\_

**TOTAL** (180) \_\_\_\_\_

**Make sure you state all your assumptions.**

Remote SCPD Students: Either send me your scanned solutions via email at [kashaw@cs.stanford.edu](mailto:kashaw@cs.stanford.edu) or fax them to me at 650-725-6949. You must also send your written copy to me via SCPD.

## 1) Socket Programming and HTTP (30 pts)

You are given the task of writing a Perl program that takes a filename and a single word as arguments.

```
> myPerlProgram.pl list.txt word
```

Each line in that file contains a host and path pair which looks like

```
www.foo.com /tom/a.html  
www.duke.edu /index.html
```

Your program opens the named file and connects to each host in the file using port 80. It then requests the file specified by the path and searches for the number of lines in the returned file that contain the word specified on the command line.

Your program should then create an output file called “word.out”. Each line in this file should contain the host, path, and number of lines in the corresponding file that include the specified word.

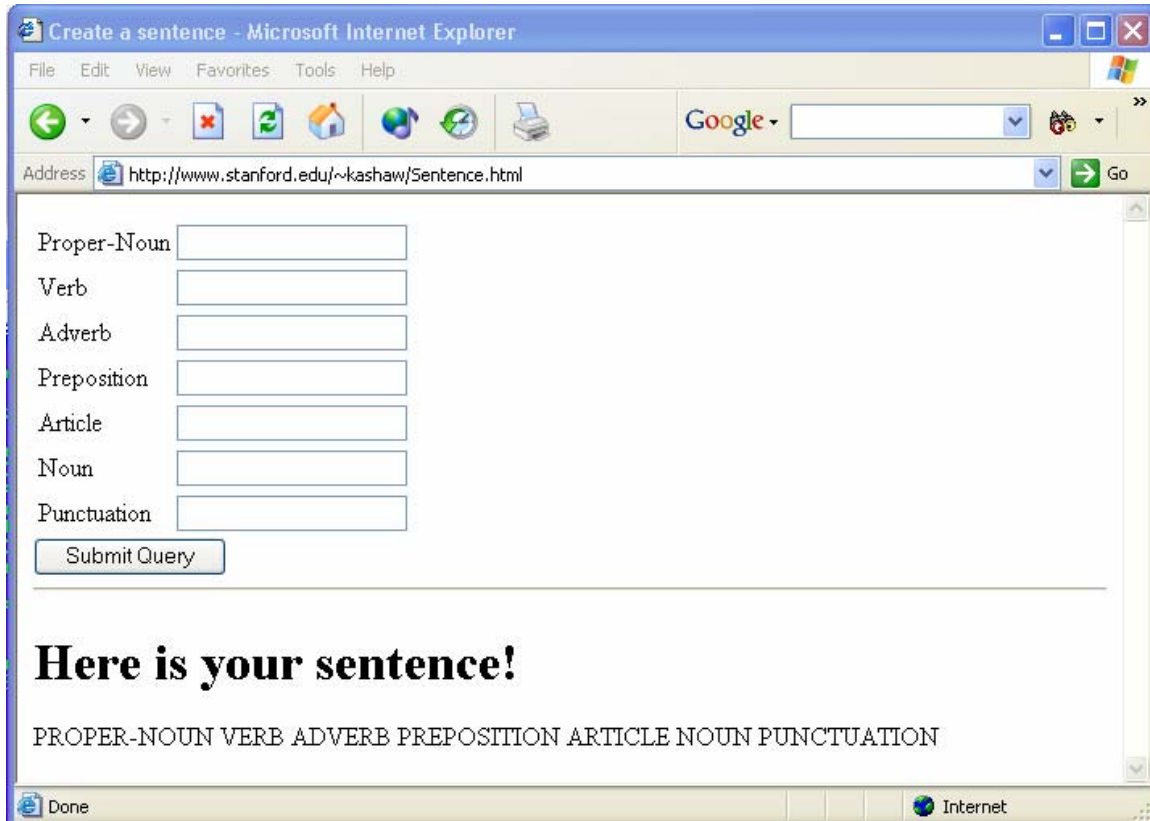
For simplicity, you can assume a simple connect(HANDLE, \$host, \$port) function exists that performs the work of setting up the socket. You must then send the appropriate HTTP commands to the remote web server using the HANDLE.

```
#!/usr/bin/perl -w  
use Socket;  
use FileHandle;
```



## 2) Servlets/JSPs (40 pts)

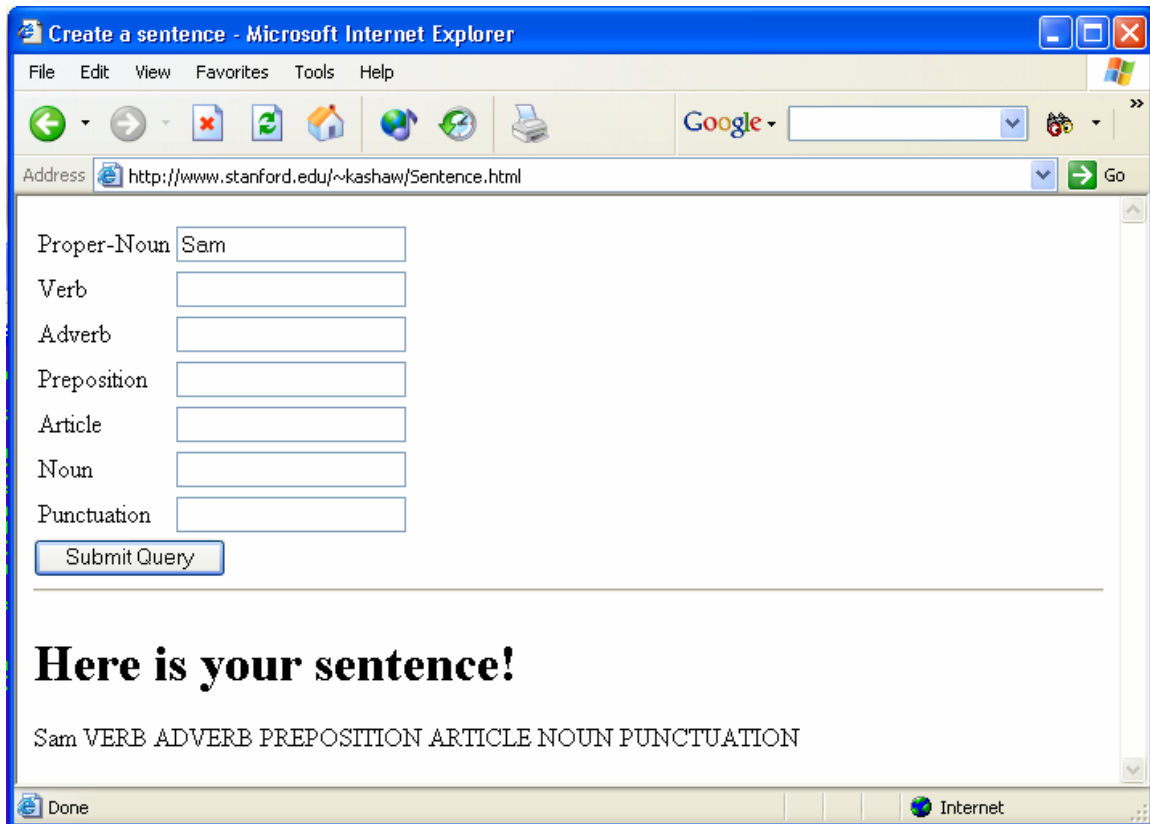
Your job is to create a simple servlet that allows users to create sentences. The page starts with a little form which lets the user enter the components of the story. It contains text boxes that need to be filled in as well as a submit button.



As the user submits portions of the sentence, you will print out their sentence at the bottom of the page. This string will be ordered in the following manner:

PROPER-NOUN VERB ADVERB PREPOSITION ARTICLE NOUN PUNCTUATION

There is the additional restriction that once a value has been entered, it must both appear in the text area and in the appropriate position at the bottom of the page as shown below for the PROPER-NOUN. The text and text area for each grammar element should be generated by a JSP (myGrammarElement.jsp). The JSP will generate one row of html starting with `<tr>` and ending with `</tr>`.



To help with the JSP, you have the GrammarBean class which represents the “grammarType” and “value” strings in the standard way.

```
package myBeans;
```

```
public class GrammarBean {  
    private String grammarType;  
    private String value;  
  
    public GrammarBean(){  
        grammarType = "";  
        value = "";  
    }  
    public GrammarBean(String t, String v){  
        grammarType = t;  
        value = v;  
    }  
    public String getGrammarType(){  
        return grammarType;  
    }  
    public String getValue(){  
        return value;  
    }  
    public void setValue(String v){  
        value = v;  
    }  
}
```

```
//Here is the standard header for a Servlet
import java.io.*;
import java.text.*;
import java.util.*;
import javax.servlet.*;
import javax.servlet.http.*;
import myBeans.*;

public class GrammarServlet extends HttpServlet {

    public void doGet(HttpServletRequest request,
                      HttpServletResponse response)
        throws IOException, ServletException {
        // your code starts here
    }
}
```



```
} // end of servlet code
```

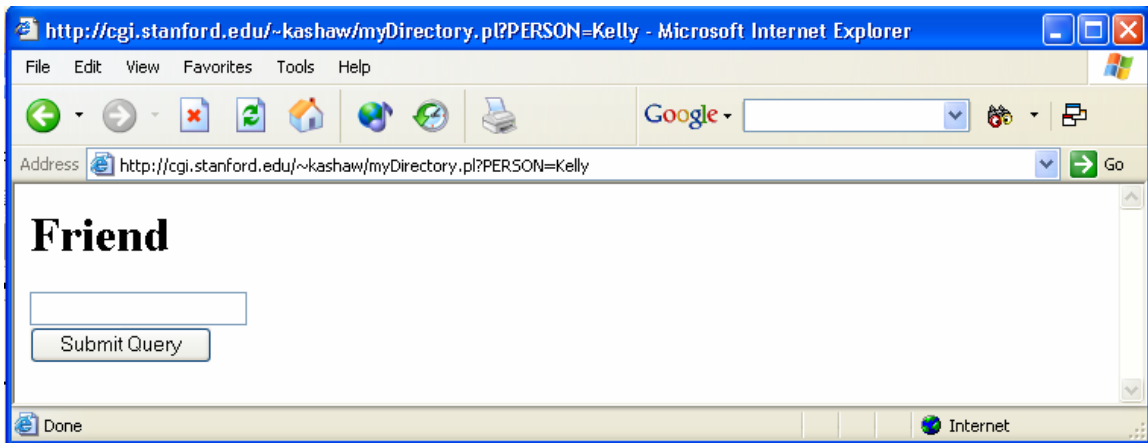
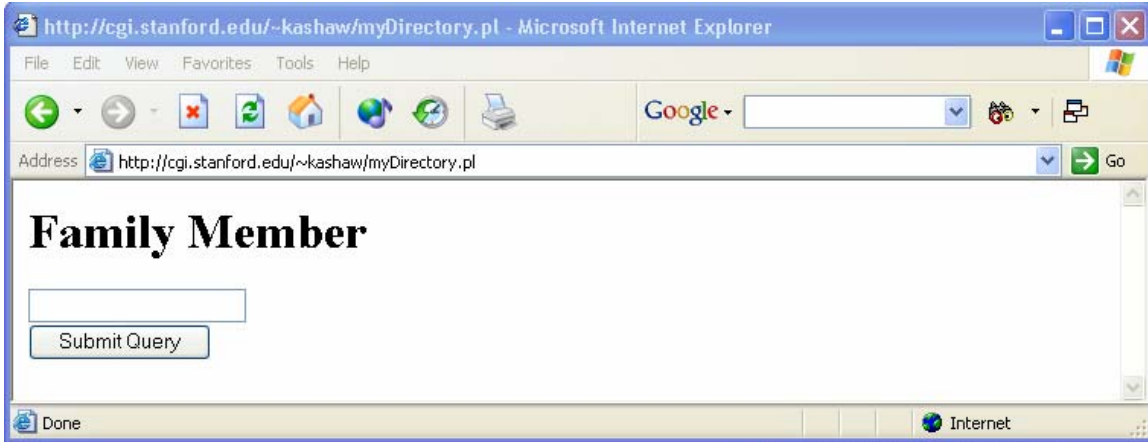
---

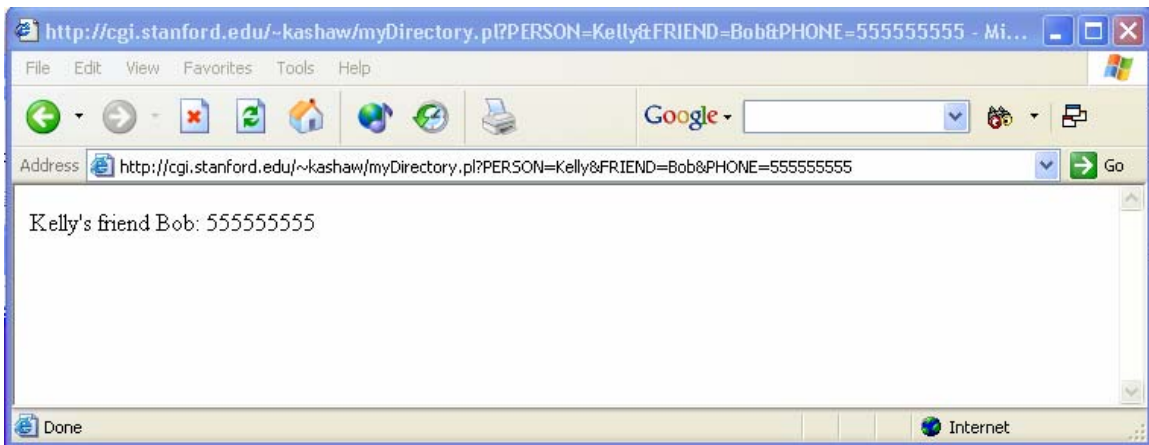
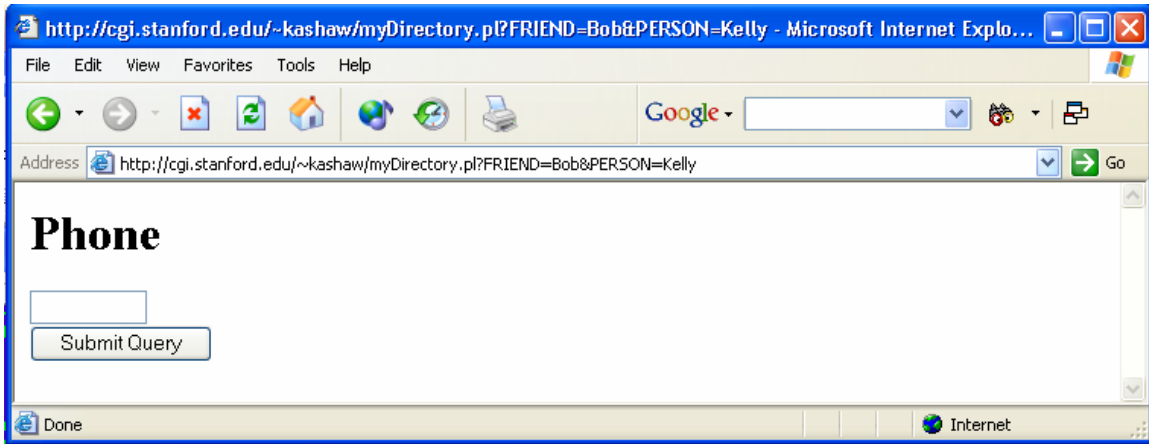
---

```
// MyGrammarElement.jsp  
// This file should generate only ONE grammar element (Name/textbox)  
// YOUR CODE HERE
```

### 3) CGI (35 pts)

For this problem, you will write a simple CGI script that is used to create a family's list of friends' telephone numbers. You will write a series of 4 pages. On the first page, the family member associated with the friend is entered. On the second page, another text area is displayed for the user to enter the friend's name. On the third page, the user will be given a 9 character long text box to enter a phone number. On the final page, the family member's name, friend's name, and friend's phone number are all displayed. This information could then be used to update a family directory, but we're not going to have you do that for the exam. See the sequence of pages below.





Use hidden fields to keep track of the user input as you move from one page to the next.

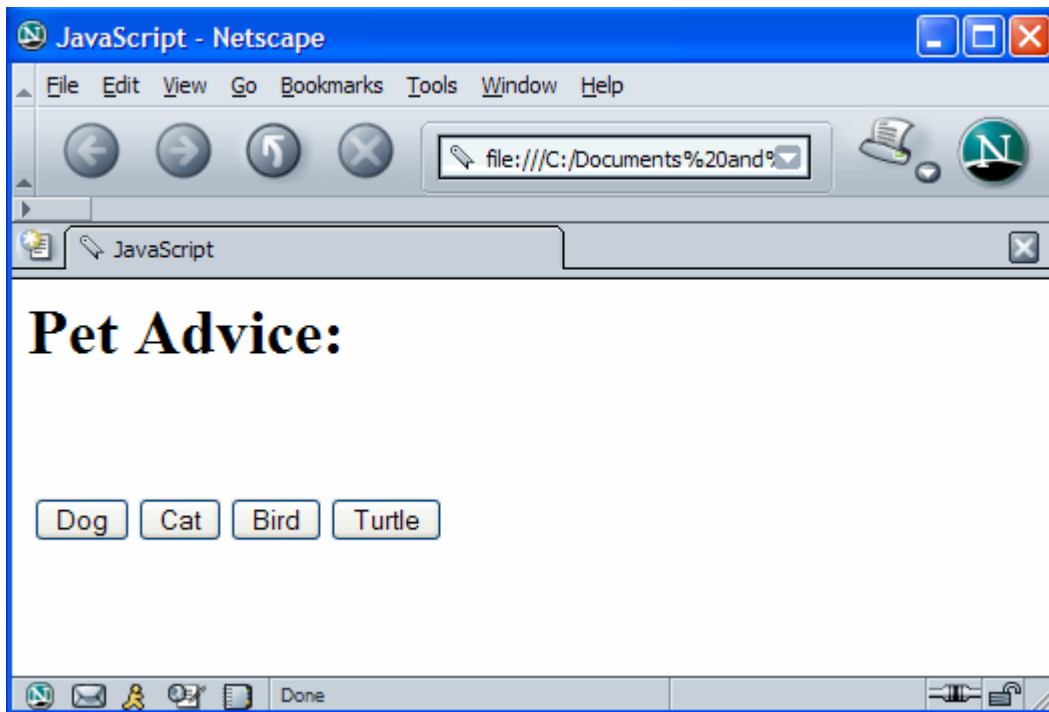
```
#!/usr/bin/perl  
##  
use CGI;
```

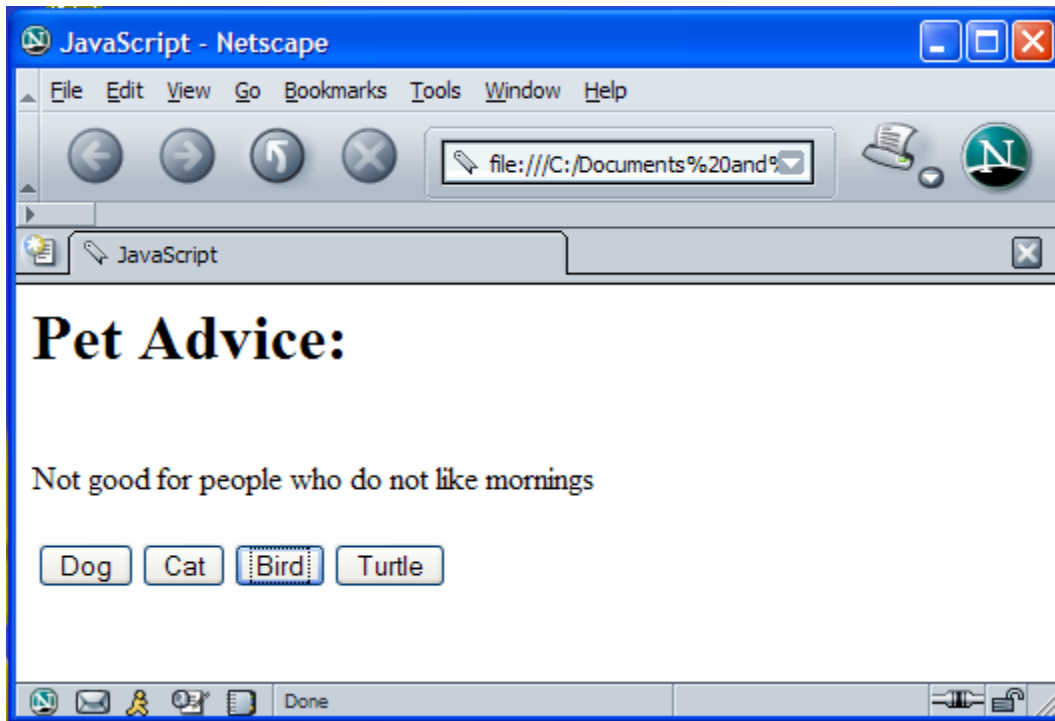


#### 4) JavaScript (35 pts)

You are given the job of writing a JavaScript page which helps people determine which type of pet suits their lifestyle. Initially, the page displays four buttons labeled: Dog, Cat, Bird, and Turtle as seen in the picture below. When the user clicks on a button, you should add a string of text associated with the animal specified on the button. (These strings of text for each animal should be stored in an array in your code, making them easily accessible on a button click.) This should be done in typical JavaScript fashion, meaning it should not contact the server.

Write the JavaScript code to generate a page that initially shows the first window and then generates a new JavaScript page once a button has been pressed. You should store the comments for each animal in an array which can then be accessed on a button click.





```
//HERE IS THE START OF YOUR FILE
```

```
<HTML>  
<HEAD><TITLE>JavaScript</TITLE>  
<SCRIPT TYPE="text/javascript">
```



## 5) Short Answer (40 pts)

a) Specify 4 pieces of information stored as part of a cookie stored at a client.

b) Suppose a client makes a request for the url “http://foo.com/a/b” where “b” is actually a directory. The server knows to map these directory requests to the file “index.html”. Why would the server respond with a redirect response (status code 3xx) instead of simply returning the file “index.html”?

c) Why are certificate authorities needed when asymmetric key cryptography is used?

d) (T or F) Digital signatures insure secrecy.

e) When a client types 'nslookup www.google.com', how does the DNS service map the name to an IP address? (Hint: How many DNS servers get contacted?)

f) (T or F) A plaintext message encrypted with Alice's public key can be decoded by anyone with a copy of Alice's public key.

g) Suppose you need to dynamically generate web pages, and you're deciding between using CGI scripts vs. servlets. Your friend says there is no performance difference between the two. Is she right?

h) (T or F) JavaServer Pages (JSPs) eliminate round-trip latencies by generating responses at the client.

i) Suppose you have a large family living in one house. Because you want to save money, you only want to purchase one IP address. How can you still have multiple people using their laptops simultaneously? Explain how your solution works.