

First Exam

March 10th, 2020

Name: _____ **ID#:** _____ **Section:** _____ **Serial#:** _____

Part 1. Short Answer Questions (10 points) [CLO1, CLO2]

1. What is the reserved (default) port number for the *http* protocol? (0.5 pt)

80

2. When is the Domain Name Service may NOT be needed? (0.5 pt)

When we have the IP address.

3. What is the purpose of the Connection header in the HTTP message? (1 pt)

To determine whether the TCP connection should be closed (non-persistent) or stay for subsequent requests (persistent)

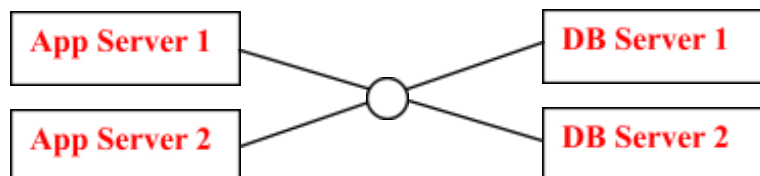
4. What is the purpose of using non-persistent cookies? (1 pt)

They are deleted after the user session is over and they are usually called session cookies.

5. You have a system where the application server and the database are on the same node (server). You are asked to improve the architecture of the system in order to enhance its performance and scalability. What are the architectural techniques that you should use in order to achieve better performance and scalability? (1 pt)

We use replication and specialization for multi-tier architecture

6. In Question 5: if you were provided with three more servers. Draw the new system architecture based on your answer in Question 5. (2 pt)



7. Using which method will send the Location header to the user? (1 pt)

- a. sendRedirect method in the HttpServletResponse object**
- b. forward method in the RequestDispatcher object

8. A GET request is sent to host www.se432-spring2020.com at Port 8080? The request is sent when submitting a form that contains two parameters (*course* and *exam* where the value of *course* is *se432* and the value of *exam* is *first exam*) to a page called *easyexam*. The request is part of the session 123456 where *jsessionId* is sent as a path parameter. Also, the browser sends the cookie *university* with a value of *JUST*. You need to include the host name and the port in the right header. What is the generated HTTP request message? (3 pts)

0.5 0.5 0.5
GET /easyexam;jsessionId=123456?course=se43&exam=first exam HTTP/1.1
Host:www.ses432-spring2020.com:8080 1
Cookie:university=JUST 0.5

Part 2. Servlet Related Questions (10 points) [CLO3]

1. Given a GET *http* request containing an unknown number of parameters. Assuming that each parameter contains only one value (either a string or an integer); use the provided Submission and Submissions classes to write a servlet that will do the following:
- If the parameter value is an integer, then add it to the *sum* of all integers.
 - If the parameter value is a string, then append it to the *text* values.
 - You need to add the resulting *sum* and *text* values to a Submission object and then add this Submission object to the list of submissions in the Submissions object.
 - You need to keep track of all the previous submissions in the user's session.
 - You cannot use any library to check if the number is numeric or not. You can use the Integer.parseInt method only.**

```
package models;
public class Submission {
    private int sum=0;
    private String text="";
    public int getSum() {return sum;}
    public void setSum(int sum) {this.sum = sum;}
    public String getText() {return text;}
    public void setText(String text) {this.text = text;}
    public String toString(){return "Sum: " + sum + "<br>" + "Text: " + text;}
}
```

```
package models;
import java.util.ArrayList;
public class Submissions {
    private ArrayList<Submission> submissions = new ArrayList<Submission>();
    public void add(Submission sub){submissions.add(sub);}
    public String toString(){
        String temp="-----";
        for(Submission sub: submissions){
            temp+=sub.toString();
            temp+="-----";
        }
        return temp;
    }
}
```

```

package servlets;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.*;
import models.*;

public class RequestParser extends HttpServlet {

    protected void doGet(HttpServletRequest request, HttpServletResponse response) throws
        ServletException, IOException {

        response.setContentType("text/html");

        HttpSession session = request.getSession();    //0.5

        Submissions subs = (Submissions)session.getAttribute("subs");    //1

        if(null==subs){    //0.5
            subs = new Submissions();    //0.5
            session.setAttribute("subs", subs);    //0.5
        }

        Enumeration<String> params = request.getParameterNames();//1

        Submission sub = new Submission();//0.5

        int sum = 0;
        String text = "";
        while (params.hasMoreElements()) {    //0.5
            String param = params.nextElement();//0.5
            String paramValue = request.getParameter(param);    //1

            try {    //0.5
                sum += Integer.parseInt(paramValue);    //0.5
            } catch (NumberFormatException e) {    //0.5
                text += paramValue + "<br>";    //0.5
            }
        }

        sub.setSum(sum);    //0.5
        sub.setText(text);    //0.5
        PrintWriter out = response.getWriter();

        out.println(sub.toString());
        subs.add(sub);    //0.5
        out.println(subs.toString());
    }
}

```

}