Session 15

RESTful Services
Part 3

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Lecture Objectives

- Understand how to pass parameters from the URL to a Web service
- Understand how to return values from a Web service using the @Produces annotation

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Data Exchange

- We define the data exchanged through annotation for Produces and Consumes
- Content format is negotiated by the client and server based on the annotation and the ability of each to handle various formats

@Consumes

- @javax.ws.rs.Consumes
- Defines the MIME type the class methods can accept
- Defined at either the class level or the method level
- Selected values
  - application/json
  - application/octet-stream
  - text/html
  - text/plain
  - multipart/form-data
  - application/x-www-form-urlencoded

Typical browser encoding of the form data set

Strings defined in javax.ws.rs.MediaType

Example

```
@Consumes({MediaType.TEXT_PLAIN,
MediaType.TEXT_HTML})
```

@Produces

- @javax.ws.rs.Produces
- Defines the MIME type that a REST resource class method can return to the client
- Defined at either the class level (defaults for all methods) or method level
- Selected values
  - application/json
  - application/octet-stream
  - text/html
  - text/plain

Example

```
@Produces({"image/jpeg,image/png"})
```


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Path Templates

- A path can be defined with a path template - essentially a placeholder for a value to be defined by the user
- Parameter is obtained in the following example

```
@Path("/users/{username}")
public class UserResource {
  @GET
  @Produces("text/html")
  public String getUser(@PathParam("username") String
     userName) {
...
  }
}
```


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Example

- In the QueryParameters example, we obtained the card number from the form data set

```
public class LibrarycardsResource {
...
    @GET
    @Produces(MediaType.TEXT_HTML)
    public String getText(@QueryParam("cnum") int
cardNumber)
```

- Alternatively, we can obtain it directly from the URL with a call such as `localhost:8080/CSE336-Services/library/librarycards/124`

```
@GET
   @Produces(MediaType.TEXT_HTML)
   public String getCard( @PathParam("cnum") int cardNumber) {
```

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Web Resources Style

- The PathParameter annotation provides a different style in requesting Web resources
- Example

```
localhost:8080/CSE336-Services/library/librarycards/124
```

- Made to appear as a data retrieval where the path (e.g., librarycards) appears as a plural data resource, and the path parameter (e.g., 124) appears as if it were an index in the repository for the data resource

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@Produces Annotation

- The above example returned html that displays as

```
@GET
@Produces(MediaType.TEXT_HTML)
  public String getCard(@PathParam("cnum") int cardNumber) {
  String s1 = "<html><body><h1>";
  String s2 = "</h1></body></html>";
  String message = "";
  if (cardNumber==123){
    message="{num:123, nickname:'Alonzo' type:'Adult'}";
    return s1+message+s2;  }
  else {return s1 + "Would you like to apply for a library card?" +
s2; } }
```

{num:123, nickname:'Alonzo' type:'Adult'}

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@Produces Example

- If we change the @Produces annotation, the response is not evaluated as html, and only appears as plain text

```
@GET
 @Produces(MediaType.TEXT_Plain)
   public String getCard(@PathParam("cnum") int cardNumber)
{
```

<html><body><h1>{num:123, nickname:'Alonzo', type:'Adult'}</h1></body></html>

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@Produces Example

- If we again change the @Produces annotation, when called with localhost:8080/CSE336-Services/library/librarycards/125 it returns the JSON string

```
@GET
@Produces(MediaType.APPLICATION_JSON)
public String getCard(@PathParam("cnum") int cardNumber) {
  String s1 = "<html><body><h1>";
  String s2 = "</h1></body></html>";
  String message="{num:123, nickname:'Alonzo' type:'Adult'}";
  if (cardNumber==123){
    return s1+message+s2;
  }
  else {
    return message;
  } }
```


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How Do We Deal With the Same Origin Policy?

- In JAX-RS, you add a class that sets the allow headers, as in

```
import javax.ws.rs.container.*;
import javax.ws.rs.ext.Provider;
import java.io.IOException;
@Provider
public class CORSFilter implements ContainerResponseFilter {
    @Override
    public void filter(ContainerRequestContext requestContext,
            ContainerResponseContext cres) throws IOException {
      cres.getHeaders().add("Access-Control-Allow-Origin", "*");
      cres.getHeaders().add("Access-Control-Allow-Headers", "origin,
content-type, accept, authorization");
      cres.getHeaders().add("Access-Control-Allow-Credentials", "true");
      cres.getHeaders().add("Access-Control-Allow-Methods", "GET, POST,
PUT, DELETE, OPTIONS, HEAD");
      cres.getHeaders().add("Access-Control-Max-Age", "1209600");  } }
```


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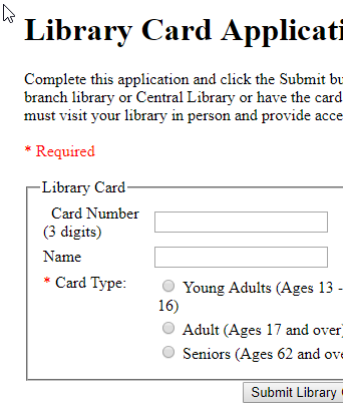
Example - Ajax Access - Web Services ...

- User enters a card #, and tabs out of the field
- Onblur event causes a request to the Web service
- Response is a JSON string containing the values of the component fields
- The string is parsed, and name field updated to show the name



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... Example - Ajax Access - Web Services ...

```
function requestCard() {
  c = document.getElementById("cnum").value;
  var url = "http://localhost:8080/CSE336-
Services/library/librarycards/"+c;
   req = new XMLHttpRequest();
   req.open("GET", url, true);
   req.onreadystatechange = update;
req.send(null);
}
...
<input type="text" id="cnum" name="cnum" onblur="requestCard()" />
...
<input type="text" id="nickname" name="nickname" maxlength="12" />
```

Note the path parameter approach

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... Example - Ajax Access - Web Services ...

```
@GET
@Produces(MediaType.TEXT_PLAIN)
public String getCard(@PathParam("cnum") int cardNumber) {
  String message="{\"num\":123, \"nickname\":\"Alonzo\",
      \"type\":\"Adult\"}";
  if (cardNumber==123){
    return message;
  }
  else {
    return "";
  }
}
```

Remember. Single quote in Java defines a char literal, so we need to escape the nested double quote

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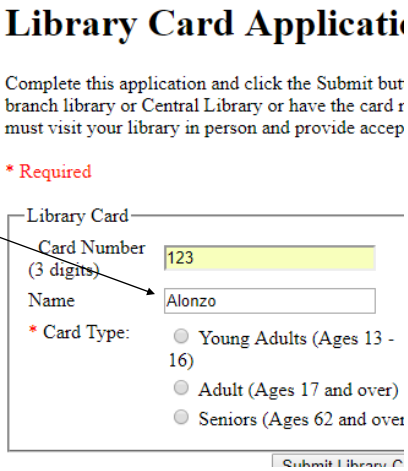
... Example - Ajax Access - Web Services

```
function update() {
n = document.getElementById("nickname");
  if (req.readyState==4 && req.status==200){
      var obj = JSON.parse(req.responseText);
      n.value=obj.nickname;
  }
}
```

Be careful with your single and double quotes

update is the XLHttpRequest callback function



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Assignment 5 - Part a

- Use your Brooklyn Library html to make web service calls on a library resource
- Define a Java class whose data includes all the items in the Brooklyn Library form (plus a card # field).
- Your service should be able to access a collection (minimum of 5 cards) of the card data (serialized in some appropriate format to a file)
- When the user hits submit after entering only the card # and last name, if combo is found in server, return data just as a string of Json.

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Have You Achieved the Lecture Objectives?

- Understand how to pass parameters from the URL to a Web service
- Understand how to return values from a Web service using the @Produces annotation

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