

**APPLICATIONS ON THE INTERNET  
PROBLEMS-FEBRUARY 2020**

1. A fast food shop uses an application to manage orders from home. The application uses a MySQL server with a DB called *orders*, where, among others, there is a table called *users* whose fields are *id*, *name*, *address*, with an unique ID, the name and the address of the user. It also uses a table for storing menus, called *menus*, with fields *id*, *description*, *price*. Orders are stored in a table called *ordersusers* whose fields are *id*, *id\_u*, *id\_m*, *date*, corresponding to a unique order ID, user ID, menu ID and date of order.

**Do not just write code, but briefly describe your solution.**

- a) Provide a PHP function that receives a user *id* and creates an HTML form to order. To do this, in the form the user name will be displayed and a selection list will be provided with the name and price of all the menus of the store. A user can select a single menu in this step **(0.75 points)**.
- b) Provide a PHP script that processes the form of the previous section and, as a next step, allows the user to select another menu for her current order. This script will show again the previous form and additionally a button to complete the order. To keep the information between steps use cookies **(1 point)**.
- c) Provide a PHP script to process the finish order button from above. That is, it inserts an order in the BBDD, with the information from the previous steps. You can assume that there is already implemented a function that generates a unique identifier for the order **(1 point)**.
- d) To improve the way the menus are selected for orders (see a) above), the user will be able to select multiple menus in a single step, using Javascript. A HTML table will be displayed with all menus and prices, as in the following snippet of HTML code (including numbering to facilitate your response if necessary):
- ```
1. Selected menus: <ol> </ol>
2. <Table>
3. <Tr> <td> 1 </td> <td> Hamburger </ td> 10.5 </tr>
4. <Tr> <td> 2 </td> <td> Bravas </ td> 4.5 </tr>
5. ... NO OTHER ENTRIES SHOWN
6. </Table>
```
- The user will click on the rows of the table to select the menus for the order. That is, whenever the user clicks in a row, the name of the menu will be added to the list above. To do this, using **only Javascript**, provide the code that makes that each time a user clicks on any of the rows, the name of the menu and price list selected menus are added. The list will be displayed by inserting a new item into the list (<OL>) that already exists. Indicate how to properly associate the code to the HTML fragment **(1.25 points)**.
- e) Finally, modify the preceding paragraph or provide new code that allows the user to delete the selected menus. To do this, when the user clicks on any of the menus that has already been selected, it will be removed from the selection list **(1 point)**.

2. Consider an application for movie downloads that incorporates a recommendation system based on collaborative filtering for which are defined 3 characteristics. We have the following ratings (defined between 0 and 5):

|         | Andrew | Mary | Charles | Eusebio | Laura |
|---------|--------|------|---------|---------|-------|
| movie 1 | 4      | 4    | ?       | 0       | ?     |
| movie 2 | 3      | ?    | 2       | ?       | 4     |
| movie 3 | ?      | 4    | 4       | 4       | ?     |
| movie 4 | ?      | 3    | 4       | ?       | 1     |

The following MATLAB matrices are available:  $Y$  is the matrix of ratings, wherein each undefined entry contains a "-1", the matrix  $X$  contains the characteristics of the films, for  $n$  different characteristics, and  $\Theta$  the user parameters:

$$X = \begin{bmatrix} \text{---} (x^{(1)})^T \text{---} \\ \text{---} (x^{(2)})^T \text{---} \\ \vdots \\ \text{---} (x^{(n_m)})^T \text{---} \end{bmatrix}, \quad \Theta = \begin{bmatrix} \text{---} (\theta^{(1)})^T \text{---} \\ \text{---} (\theta^{(2)})^T \text{---} \\ \vdots \\ \text{---} (\theta^{(n_u)})^T \text{---} \end{bmatrix}$$

being  $n_m$  the number of movies and  $n_u$  the number of users.

- Give the dimensions of the various matrices used and the MATLAB code to obtain a matrix  $R$ , where  $R(i, j)$  is 1 if user  $i$  has rated the movie  $j$  and 0 otherwise (**1 point**).
- Provide the necessary MATLAB code to calculate the cost function  $J$  regularized (**1 point**).
- Suppose that after running the algorithm, the following values are obtained for  $X$   $Y$   $\Theta$ :  
 $X = [0.2 \ 0.5 \ 1; \ 0 \ 1 \ 1; \ 1 \ 0 \ 0.5; \ 0 \ 0.5 \ 1];$   
 $\Theta = [1 \ 0 \ 3; \ 2 \ 1 \ 0; \ 3 \ 2 \ 0; \ 4 \ 1 \ 1; \ 0 \ 2 \ 1];$   
 Indicate what rating is predicted for the user Andrew and for the movie 3. Indicate how to check whether the result was reliable and apply it to the user Andrew. Justify your answers (**1.5 points**).
- Given the values of  $X$  and  $\Theta$  in the previous question, suppose you want to recommend to the user Andrew a movie already watched by a user with similar tastes. Indicate with supporting arguments if you would use Mary or Charles, and whether you would recommend the movie 3 or 4 (**1.5 points**).