Homework #6

Web server with PHP

KAIST

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HTML

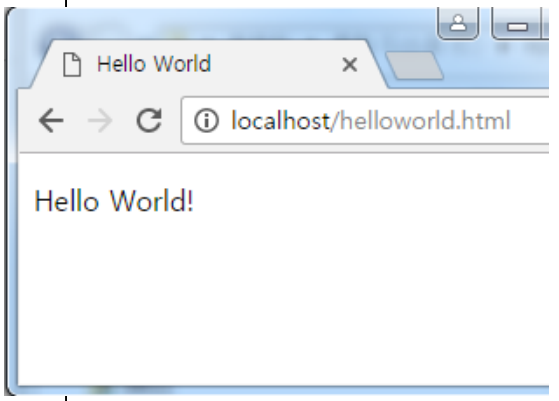
- HTML
  - A hypertext markup language for Web pages
- HTML file
  - Text mixed with Markup Tags
  - Tags Enclosed in Angle Brackets, < >
    - <title>CS360 Introduction to Database</title>
    - Lecture
  - File extension : *.**html**

HTML : Basic frame

- The html file consists of
  - <html> </html>
    - » <head></head> and <body></body>

```
<!DOCTYPE html> <!-- Declare HTML5 -->
<html>
    <head>
        <title> Hello World </title>
    </head>
    <body> <!-- Elements to print -->
        <p>  Hello World! </p>
    </body>
</html>
```

User screen



HTML : Text tags

- Basic text Tags
  - Comment : <!--comment-->
  - Fonts: ...
    - » `<font face="arial" size="2">Lecture</font>`
  - Bold font: …
  - Paragraphs : …
  - Line Breaks :
  - Link(anchor tag) : <a>…
    - » `<a href="http://www.kaist.ac.kr"> KAIST</a>`
      - href : address to be linked

HTML : Form Tag

- The form tag enables a user-to-server interaction
- Syntax of the form tag

<form action="filename" method="get"> … </form>

» Attribute 'action' : defines which file will process the form

» Attribute 'method' : defines how will this form be submitted

- "get" : data is transferred as part of the URL
- "post" : data is transferred after the URL in the same http data stream, i.e., hide the details of interaction information

HTML : Form Elements

- Form elements : elements that allow the user to enter
  - The type of input is specified with the '**type'** attribute
    - » Text
    - » Radio
    - » Checkbox
    - » Dropdown Box
      - It uses <select>..</select> tag
    - » Submit
  - The '**name'** attribute is usually used for 'key' to retrieve input information

/* For text, radio, submit types, please refer to the lecture note */

HTML : Checkbox & Dropdown Box

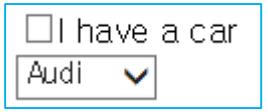
- Checkboxes
  - Used to select one or more options of a limited number of choices
- Dropdown Box
  - Similar to the radio form, the dropdown box is used to select one option
    - » Tag <select></select> creates a dropdown box
    - » Singular tag <option> creates a select option

HTML : Checkbox & Dropdown Box (cont'd)

- Example

```
<form action =""  method="get">
  <input type="checkbox"  name = "car" >I have a car<br />
  <select name="make">
    <option value="audi">Audi</option>
    <option value="ford">Ford</option>
    <option value="honda">Honda</option>
    <option value="saab">Saab</option>
  </select>
</form>
```

dropdown box



HTML : Table tag

- Defined with <table>..</table> tag
  - <table> attributes: border
- Table Row : <tr>..</tr>
- Table Data cell : <td>..</td>
  - <td> attributes : colspan, rowspan
    - » Spans each data cell in direction of column, row.
- Table Heading : <th>..</th>

HTML : Table Example

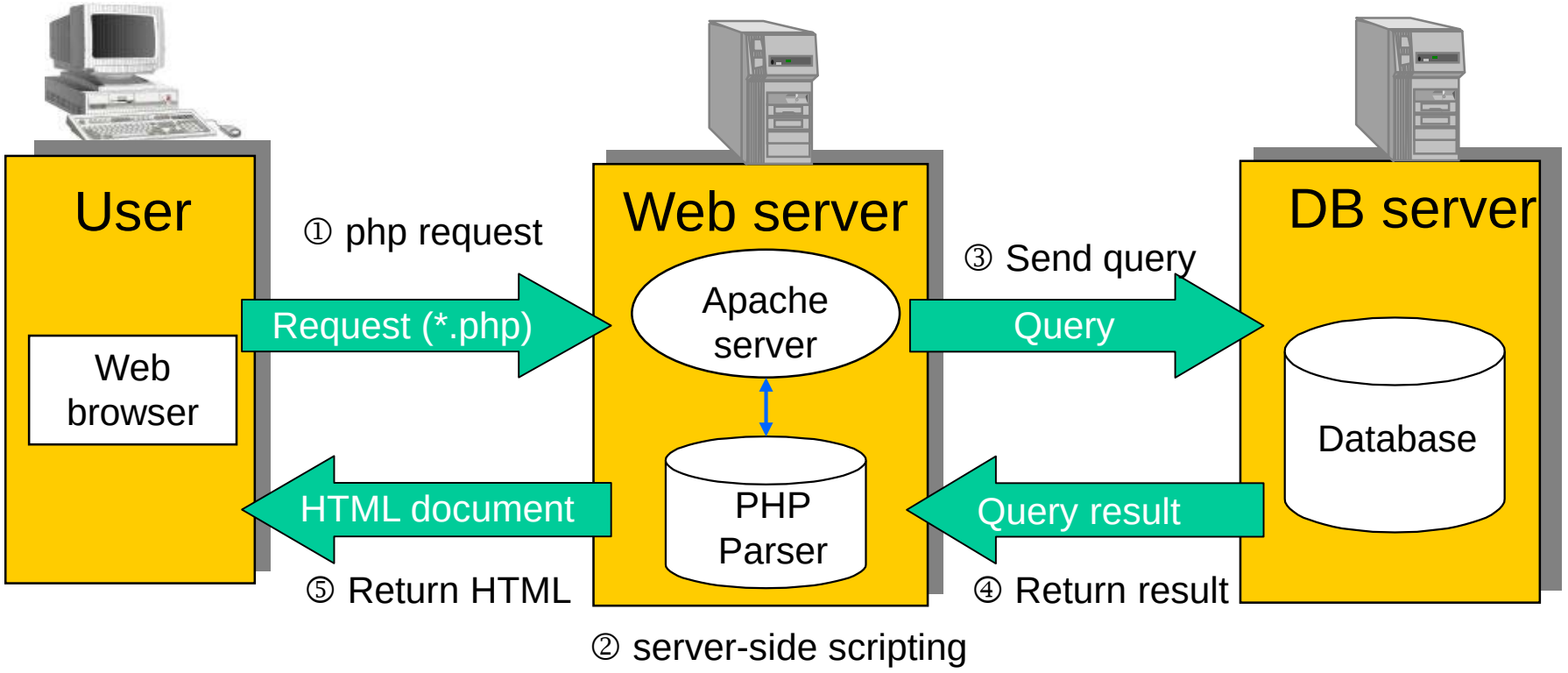
```
<table border="1">
        <tr>
                <th>Heading</th>
                <th>Another Heading</th>
        </tr>
        <tr>
                <td>row 1, cell 1</td>
                <td>row 1, cell 2</td>
        </tr>
        <tr>
                <td>row 2, cell 1</td>
                <td>row 2, cell 2</td>
        </tr>
</table>
```

/* Modern web pages use tag and <ul> tag instead of <table> tag */

Heading	Another Heading
row 1, cell 1	row 1, cell 2
row 2, cell 1	row 2, cell 2

PHP

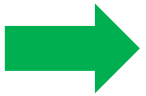
- Architecture Overview



PHP and HTML

Server file

```
<html>
    <head>
        …
    </head>
    <body>
        <p>
<?php
  echo (“Hello! World.”);
?>
        </p>
    </body>
</html>
```



User view

```
<html>
    <head>
        …
    </head>
    <body>
        <p>
          Hello! World.
        </p>
    </body>
</html>
```

PHP statements can be in anywhere of html code

PHP : Operators

- Arithmetic operator: +, -, *, /, %, ++
- Comparison operator: ==. !=, <, >, <=, >=
- Logical operator: and, &&, or, ||, xor, !,
- Concatenation operator: . //discussed in the lecture
- Conditional operator: [Boolean statement] ? A : B

```
<?php
        $a = 5;         // assignment
        $c = $a++;      // Post-increment   ($c = 5, $a=6)
        $a==$c ?  $d=1  :  $d=0;   // Conditional Operator
        $d += 10;                  // $d = $d + 10;
?>
```

PHP : Functions

- The function declaration statement and function call

```
<?php
        //function declaration
       function functionName($input1, $input2){
              $a = $input1;
              /* some processes */
              return $a; //this is not necessary
       }
       $res = functionName(2016, “CS360”);//function call
?>
```

- Some built-in functions
  - echo() : insert the inputted strings as HTML elements
  - include() : includes and evaluates the specified file

/* array_push()
isset(),
print(),
print_r() */

PHP : Example of built-in functions

- **echo()** function

HTML tag

```
<? echo("Hello world!<br>Hello world!");?>
```

User screen

Hello world!
Hello world!

- **include()** function

vars.php

```
<?php
        $color = 'green ';
        $fruit = 'apple';
?>
```

test.php

```
<?php
        echo("A", $color, $fruit); //A
        include('vars.php');
        echo("A", $color, $fruit); //A green apple
?>
```

PHP : Constants

- Use define() function

```
<?php
        define(“CONSTANT”, “Hello!  World.”);
        echo   CONSTANT;   // “Hello! World”
?>
```

- Pre-defined constants
  - TRUE : true value
  - FALSE : false value
  - __FILE__ : current file name
  - __LINE__ : current line number
  - PHP_VERSION : version of the PHP parser

PHP : Control Structure

- if-else statement

```
if($i<0){echo ‘negative’;}
elseif($i>0){echo ‘positive’;}
else{echo ‘zero’;}
```

- while statement

```
while($i<100){
    $i++;
}
```

- for statement

```
for($i = 1;$i < 10;$i++){echo “i = ”,$i;}
// i = 1 i = 2 i = 3 …
```

- foreach statement

```
$a = array(“a”, “b”, “c”, “d”, 2016);
foreach($a  as  $k => $v) {
    echo $k, “ :”,$v; } //0:a  1:b   2:c  3:d  4:2016
```

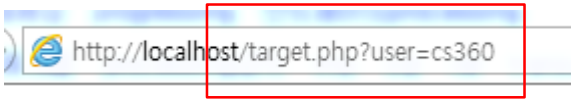
PHP : Processing <form> tag

- Declaring a php file that will do process information from <form> tag

```
<form action="target.php" method="get">
        Username: <input type="text" name="user">
        <input  type="submit" value="Submit">
</form>
```

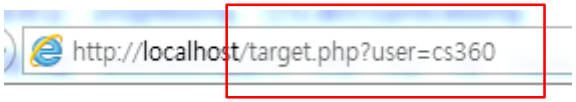
Username: Submit

- Data interaction by using the get method
  - When you click the 'Submit' button, then the web page is changed to the link 'target.php?user=CS360'
    - » If the value for the key 'user' is 'CS360'



PHP : Processing <form> tag (cont'd)

- Receiving data from <form> tag
  - Use `$_Request["key"];` in target.php file



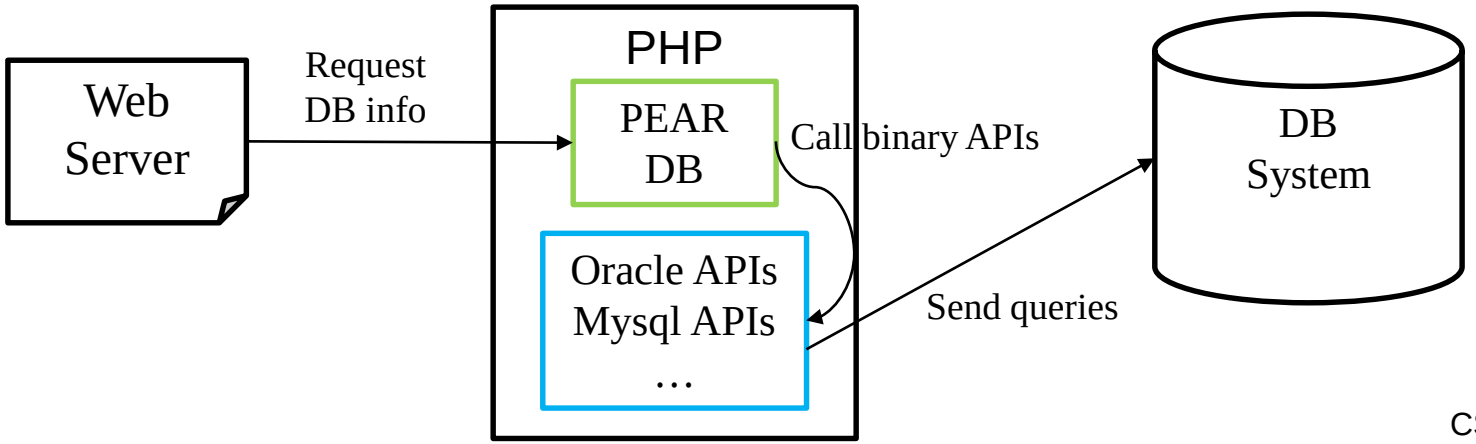
target.php

```
<?php
        $a = $_Request["user"];  // $a="cs360"
        //and some processing..
?>
```

PHP - Oracle(PEAR DB)

- Oracle Call-level interface
  - Oracle binary APIs can be called by PEAR DB package
    - » Or you can directly call Oracle binary APIs

- PEAR DB package provides the common interface to use any DB systems
    - » Such as Oracle, Mysql, SqlLite, etc.



PHP – Oracle(PEAR DB): Connection

- Example PHP code
  - Creating a DB connection using PEAR DB

```
require_once('DB.php'); //similar to include()
$conn = DB::connect('oci8://s20160000:s20160000'.
       '@dbclick.kaist.ac.kr:1521/orcl');
```

  - Disconnecting the DB connection

```
$conn->disconnect();
```

  - Please refer to the lecture note to handle SQL statements
    - » Executing SQL statements
    - » Processing a SQL statement with parameters

PHP – Oracle(PEAR DB): Others

- Two Fetch Modes

```
$conn->setFetchMode(DB_FETCHMODE_ASSOC);
$result = $conn->query("select id from employees");
while($tuple = $result->fetchRow()){
    echo $tuple["id"]."<br>";}
```

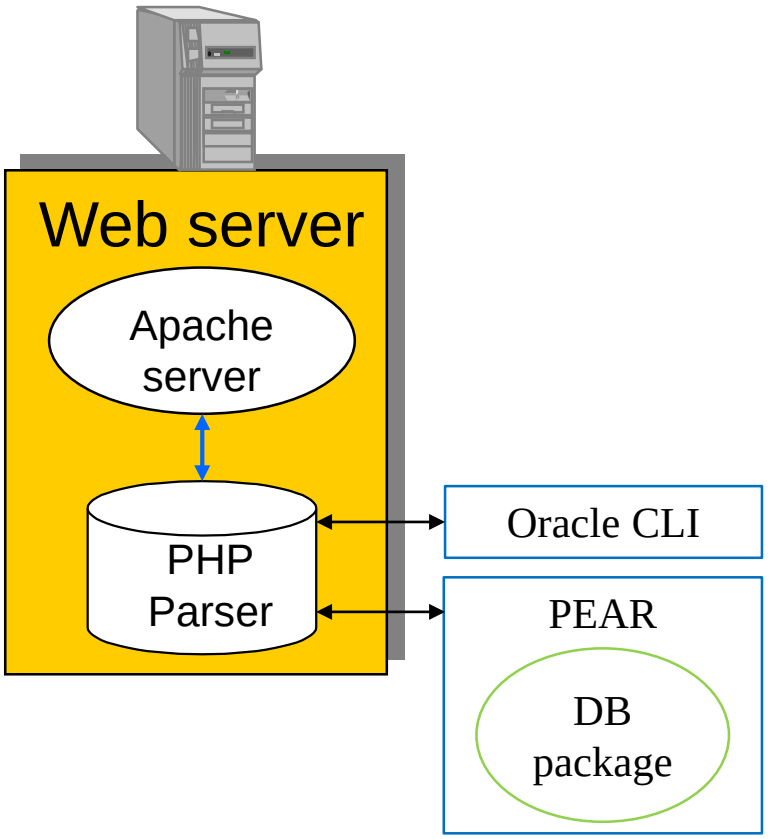
  - Tuple values can be get by using attribute names

```
$conn->setFetchMode(DB_FETCHMODE_ORDERED);
$result = $conn->query("select id from employees");
while($tuple = $result->fetchRow()){
    echo $tuple[0]."<br>";}
```

  - Tuple values can be get by using attribute orders

Installation: Overview

- Apache (Web server)
- PHP (scripter)
  - With PHP plug-ins
    - » Oracle CLI, oci8
    - » PEAR
      - DB package



Installation: Apache

- Web server(Apache2.4) installation
  - Windows: https://www.apachehaus.com/cgi-bin/download.plx
    - » Check the version of ‘Microsoft Visual C++ Redistributable’
      - ex) Microsoft Visual C++ 2012 Redistributable (VC11)
  - Linux: http://apache.tt.co.kr//httpd/httpd-2.4.23.tar.gz
    - » Cf) Install guide: https://httpd.apache.org/docs/current/install.html
  - Mac: Already installed in your PC
- Copy Apache2.4 files into a new [Apache directory]
  - Ex) c:/Apache24

Installation: Apache (cont'd)

- Run Apache2.4 in Windows
  - Start: Execute 'httpd.exe' file in '[Apache Directory]/bin' folder
    - » Then you can access to http://localhost/
      - If you don't see any error page, the installation is success
  - Stop: Close 'httpd.exe' file
- Run Apache2.4 in Mac OS
  - Start command: sudo /usr/sbin/apachectl start
  - Stop command: sudo /usr/sbin/apachectl stop

Installation: Apache (cont'd)

- Handling web page files
  - Web root directory : "[Apache directory]/htdocs" folder
    - » Ex) C:/apache24/htdocs
- URL for your web page files
  - http://localhost/***<filename>***
    - » ex) http://localhost/*helloworld.php*
      when you put *helloworld.php* file into "[Apache directory]/htdocs" folder

Installation: PHP

- PHP5.6.27 installation
  - Download from http://php.net/downloads.php
  - Copy PHP files into a new [PHP directory]
    - » Ex) c:/php
- PHP – Oracle CLI extension (1/2)
  - In [PHP Directory], rename ‘php.ini-development’ file as ‘php.ini’
  - Edit ‘php.ini’ : Add the following statements

```
extension_dir = "[PHP directory]/ext"
extension=php_oci8_11g.dll
```

Ex) extension_dir = "c:/php/ext“

Installation: PHP (cont'd)

- PHP – Oracle CLI extension (2/2)
  - Add 'php_oci8_11g.dll' file into '[PHP Directory]/ext' folder
    - » The DLL file can be downloaded from https://pecl.php.net/package/oci8
      - Recommend to use oci8 2.0.8 version in Windows
    - » If you face on problems to load php_oci8_11g.dll file, then please install 'Microsoft Visual C++ 2012 Redistributable(VC11)'
- PHP – Oracle CLI interworking check
  - In the [PHP Directory], open the shell (or prompt)
  - Type 'php –r oci_connect()'
    - » If you install correctly, then you can see following statements

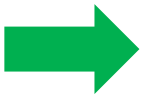
```
PHP Parse error:  syntax error, unexpected end of file in Command line code on l
ine 1

Parse error: syntax error, unexpected end of file in Command line code on line 1
```

Installation: PHP (cont'd)

- PHP – PEAR DB package
  - Download 'pear.zip' file from KLMS
  - Put unzipped files of 'pear.zip' into '[PHP Directory]/pear' folder
  - Edit 'php.ini' as below

php.ini(before)

```
...
; Windows: "\path1;\path2"
include_path=".“
...
```



php.ini(after)

```
...
; Windows: "\path1;\path2"
include_path=".;C:/PHP/PEAR”
...
```

In 'include_path', you must add your [PHP directory]/PEAR

Installation: PHP (cont'd)

- PHP – Apache configuration
  - Open the file '[Apache Directory]/conf/httpd.conf'
  - Add the following statements into the last line of 'httpd.conf' file

```
PHPIniDir "C:/php"
LoadModule php5_module "C:/php/php5apache2_4.dll"
AddType application/x-httpd-php .html .php
```

  - » **The red part must be your [PHP directory]**

Homework #6

- Prerequirements
- Problems
- Submission

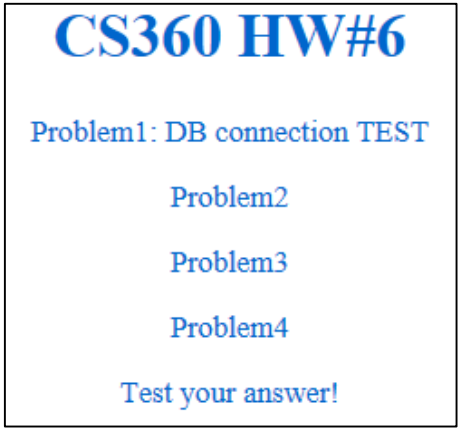
Prerequirements

- Table creation
  - » Product DB schema: Product, PC, Laptop, Printer tables as used in homework 4

1. Download *HW6db.sql* from the course homepage and copy it to (directory that Oracle Client is installed)\BIN
2. Use the *SQLPlus* and perform the command *@HW6db.sql* or *start HW6db.sql*

- Building web pages

1. Download *HW6web.zip* from KLMS and unzip
2. Copy unzipped files to (directory that Apache is installed)/htdocs
   - » Access to http://localhost/index.php and check



http://localhost/index.php

Prerequirements (cont'd)

- Contents of *HW6web.zip* file
  - index.php
  - 'Config' folder
    - » **db.connect.php**
  - 'includes' folder
    - » header.html, footer.html, style.css
  - 'problems' folder
    - » **dbConnTest.php, Q2.php, result2.php, Q3.php, result3.php, Q4.php, result4.php,**
  - 'test' folder
    - » Test.php

Prerequirements (cont'd)

- Creating a DB connection to CS360 Oracle server
  - Open ***db.connect.php*** file in *Config* folder
  - Edit constants, **DB_USER** and **DB_PASSWORD**

- You must use PHP (and HTML) in this homework

HW6 problems

- Problem1 (25points)
  - Print user tables in your database

- P1 Requirement
  - You must use *dbConnTest.php* file to print user tables
    - » Through function *get_user_tables()*
    - » Details are in *dbConnTest.php* file

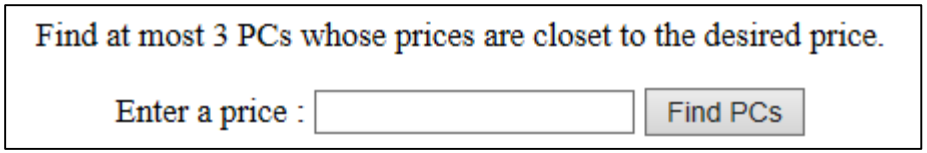
HW6 problems (cont'd)

- Problem2 (25points)
  - Ask the user for a price. Find at most 3 PCs whose prices are closet to the desired price. Print the maker, model number, RAM, hard disk, and price of the PCs.

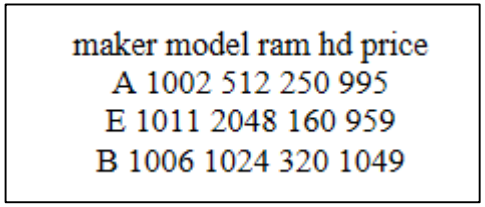
- P2 Requirement
  - Input: You implement an input screen in *Q2.php* file
  - Output: For a given input price, a relevant process is done in *result2.php* file
    - » Through function *find_3PCs()*

HW6 problems (cont'd)

- P2 Requirement (cont'd)
  - Example
    - » *Input page*



    - » *Output page (when the input price is 1000)*



HW6 problems (cont'd)

- Problem3 (25points)
  - Ask the user for a manufacturer, model number, speed, RAM, hard-disk size, screen size, and price of a new Laptop. Check that there is no Laptop with that model number. Print the input information, and also print a warning if the given model already exists, and otherwise insert the information into tables Product and Laptop.

- P3 Requirement
  - Input: You implement an input screen in *Q3.php* file
    - » A RAM size is one of 1024, 2048, 4096, 8192
    - » A speed of Laptop is less than 3.0
    - » No blanks in input forms are allowed

HW6 problems (cont'd)

- P3 Requirement (cont'd)
  - Output: A relevant process is done in *result3.php* file
    - » Through function *insert_Laptop()*
  - Example
    - » *Input page*

Manufacturer :

Model :

Speed:

RAM : 1GB

Hard disk size :

Screen size :

Price :

Insert a Laptop

Output page

The laptop with (A, 2010, 2.0, 1024, 256, 13.0, 100) can't be inserted.
The model 2010 already exists.

The laptop with (A, 2016, 2.0, 1024, 256, 13.2, 1000) is inserted

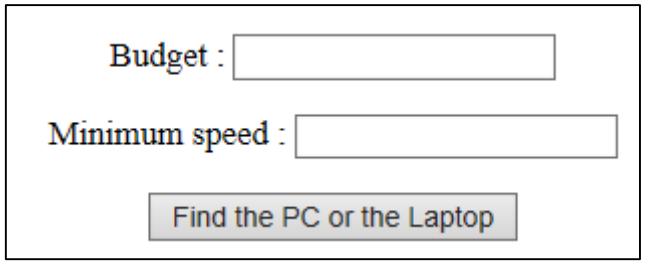
HW6 problems (cont'd)

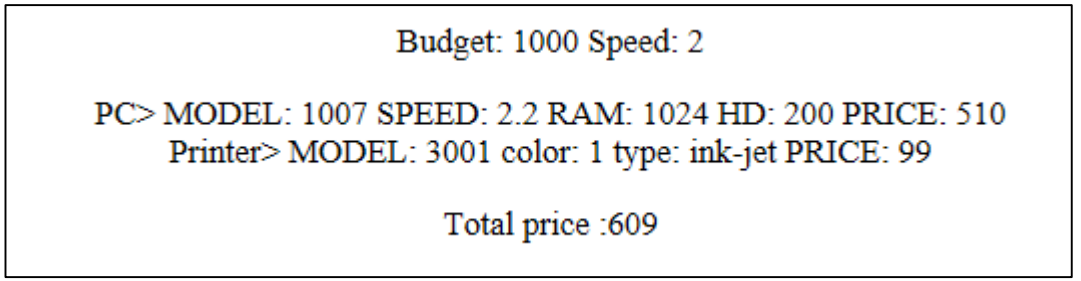
- Problem4 (25points)
  - Ask the user for a "budget" that is a total price of PC+Printer or a total price of Laptop+Printer, and a minimum speed of the computer. Find the cheapest "system" (PC+Printer or Laptop+Printer) that is within the budget and minimum speed, but make the printer a color printer if possible. Print the total price of the system, and all specifications (model, speed, price, color, etc.) of the system

- P4 Requirement
  - Input: You implement an input screen in *Q4.php* file

HW6 problems (cont'd)

- P4 Requirement (cont'd)
  - Output: A relevant process is done in *result4.php* file
    - » Through function *find_system()*
  - Example
    - » *Input page* *Output page*





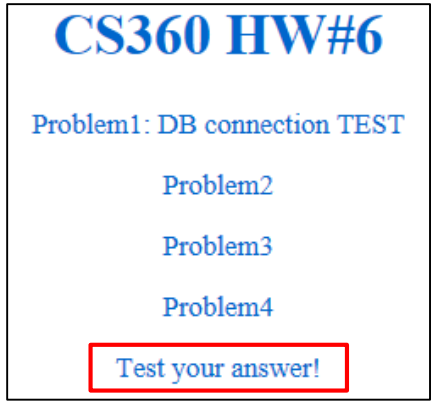
HW6 Submission

- Files to submit
  - 1. PHP(*.php) files in the '***problems***' folder
    - » Those files are given in *HW6web.zip* file
    - » Total 7 files with 4 problems
  - 2. Archive them into [student ID].zip and upload it to course homepage (KLMS)

- Due date
  - November 17(Thur), 11.59 p.m.
    - » No delay
    - » No copy (zero score for each)

HW6 Noted items

- You can test your code
  - Through the link ‘Test your answer!’ in the *index.php* file
- HW6 score
  - UI part + functionality part
- TA info
  - Kwang Hee, Lee (kwanghee@dbserver.kaist.ac.kr)
- Office hour
  - Room#404, N1 building
  - Wed: 4:00~5:30, Fri: 2:30~4:00



Reference

- HTML
  - HTML utorial : http://www.w3schools.com/HTML/html_intro.asp
  - http://htmlplayground.com
- PHP
  - php.net : http://php.net/docs.php
- PHP-PEAR DB (oci8)
  - https://pear.php.net/package/DB/docs/latest/DB/DB_oci8.html