KANDIDAT

PRØVE

IDG2003 1 Back-end web utvikling I

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Instructions

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Multiple Choice Questions

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Short Structured Questions

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Long Structured Questions

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19	Programmering

1 What will be the output of the following PHP code ?

```php
<?php
$a = "1";
switch($a)
{
case 1:
    break;
    print "hi";
case 2:
    print "hello";
    break;
default:
    print "hi1";
}
?>
```

Select one alternative:

- no output
- hihi1
- hi1
- hihellohi1

Maks poeng: 2

2 What will be the output of the following PHP code ?

```php
<?php
$user = array("Ashley", "Bale", "Shrek", "Blank");
for ($x=0; $x < count($user) - 1; $x++)
{
    if ($user[$x++] == "Shrek")
    continue;
    printf ($user[$x]);
}
?>
```

Select one alternative:

- BaleBlank
- Bale
- AshleyShrek
- AshleyBaleBlank

Maks poeng: 2

3 Which one of the following is the very first task executed by a session enabled page?

Select one alternative:

- Delete the previous session
- Handle the session
- Check whether a valid session exists
- Start a new session

Maks poeng: 2

4 Which of the following function is capable of reading a file into a string variable?

Select one alternative:

- file_get_content()
- fgets()
- file_get_contents()
- fread()

Maks poeng: 2

5 Which one of the following function is useful for producing a timestamp based on a given date and time?
Select one alternative:

- mktime()
- time()
- date()
- gmdate()

Maks poeng: 2

6 In WordPress, what is the user role with the highest privilege level ?
Select one alternative:

- Author
- Contributor
- Editor
- Administrator

Maks poeng: 2

7 MVC is composed of three components, these are ?
Select one alternative:

- Member Vertical Controller
- Main Variable Controller
- Model Visual Constructor
- Model View Controller

Maks poeng: 2

8 In the MVC architecture, model defines the :
Select one alternative:

- Data-related logic layer
- Data access layer
- All of the above
- Interface layer

Maks poeng: 2

9 What is the name of the configuration file in WordPress ?

Select one alternative:

- config.php
- wp-config.php
- wp-settings.php
- header.php

Maks poeng: 2

10 What is the difference between WordPress Posts and Pages?

Select one alternative:

- None of the above
- There is no difference between Posts and Pages
- Posts are entries listed in reverse chronological order on the site homepage and Pages are static and are not listed by date.
- Pages are entries listed in reverse chronological order on the site homepage and Posts are static and are not listed by date.

Maks poeng: 2

11 What is the main difference between HTTP POST and HTTP GET? Which one would you use to upload a file to the server?

Skriv ditt svar her

GET and POST are both superglobals that we can use to store information. This way, we can access that information across different pages. The main difference is how this information is stored. GET stores its data in the URL. We can see the data saved there, bookmark it, and read from it on another page. POST, on the other hand, hides the saved information. We can not see it in the URL nor bookmark the page with the current data.

Because GET saves information in the URL, it is less secure, as everybody can see and access the information through the URL. It is, therefore, not suitable for sensitive information such as passwords. It can also store less data than POST.

I would use POST to upload a file because it is more secure, and we don't necessarily know what data the file contains and if it needs to be protected or not.

Maks poeng: 3

12 Consider the two variables, $int1 = 12 and $str1 = '12', would a comparison such as ($int1 === $str1) return TRUE or FALSE? Briefly explain why.

Skriv ditt svar her

PHP is a loosely typed language. That means that it "converts" datatypes for us. This means that we can compare a string and an int and get the result TRUE if we use the "==" operator. It is important to note that in this task, we are using the "===" operator. This operator checks if the two values are identical, which there aren't in this example. Therefore the result would be FALSE.

Maks poeng: 3

13 Both Sessions and Cookies are used to store information. List the ways in which they are different from each other in terms of :

1. Where is the information stored?
2. What happens when the browser is closed?
3. How would you destroy them?

Fill in your answer here

1. Where is the information stored?

Cookies are storeed in the user client (the browser the user uses, such as Google Chrome, Safari, Firefox). Session, on the other hand, are stores remotely on the server.

2. What happens when the browser is closed?
When the browser is closed, sessions are destroyed and discarded.
Cookies remain on the user's client until they expire or the user decides to delete them manually.

3. How would you destroy them?
You can destroy cookies and sessions by setting their expire date in the past (for example, I can select the expiration date to last week). The cookies or session will be deleted.
There are also functions to destroy sessions such as "session_destroy();"
we also need to delete the session cookie

Maks poeng: 6

14 The following code attempts to create a new file named "testfile.txt". However the file creation fails. Modify the code to fix the problem.

```
<?php
   $fh = fopen("testfile.txt", 'r')
      or die ('File creation failed!');
?>
```

Additionally, add 1 more expression to write the string $str = "hello" to the file.
Submit your functioning code below.

Fill in your answer here

```
1  <?php
2
3  $fh = fopen("testfile.txt", 'w')
4      or die('File creation failed!');
5
6  $text = "hello";
7  fwrite($fh, $text) or die("Failed!");
8  ?>
9
10
11 //We can use "w" instead of "r" because "w" attempts to create a file if it does not exist while "r"
       does not
```

Maks poeng: 3

15 Write a function for a progressive tax system, that takes as input argument, the pre-tax income and returns the payable tax based on the income.

There is a flat tax rate of 5 % on all income.
Additionally, there is a surplus tax applicable for each of the tax brackets below :
First 10 000 NOK is not taxed
Next 10 000 NOK is taxed at 10 %(surplus 1).
Next 10 000 NOK is taxed at 15 %(surplus 2).
Any amount exceeding 30 000 NOK is taxed at 20 %(surplus 3).

Example 1, consider a person earning 45 000 NOK pre-tax,
Their tax will be calculated as follows :
First 10 K : No surplus tax
Surplus1 : 10 000 (taxed at 10 %)
Surplus2 : 10 000 (taxed at 15 %)
Surplus3 : 15 000 (taxed at 20 %)
Plus general 5% flat tax rate on general income of 45 000 NOK

Tax = (5% of 45000) + (10% of surplus 1) + (15% of surplus 2) + (20% of surplus 3) = 7750 NOK

Example 2, A person earning 15 000 NOK pre-tax,
First 10 K : No surplus tax
Surplus1 : 5 000 (taxed at 10 %)
Surplus2 : 0 , Surplus3 : 0
Plus general 5% flat tax rate on general income of 15 000 NOK

Tax = (5% of 15000) + (10% of surplus 1) + (15% of surplus 2) + (20% of surplus 3) = 1250 NOK
Skriv ditt svar her

```php
//I don't know how taxes work, but I think this code should work lmao

<?php

function tax($income){

    if($income > 30000){
        echo "over 30k<br>";
        $taxToPay = ($income*0.05) + (10000*0.1) + (10000*0.15) + (($income-30000)*0.2);
    }elseif($income > 20000){
        echo "over 20k<br>";
        $taxToPay = ($income*0.05) + (10000*0.1) + (($income-20000)*0.15);
    }elseif($income > 10000){
        echo "over 10k<br>";
        $taxToPay = ($income*0.05) + (($income-10000)*0.1);
    }else{
        echo "under 10k<br>";
        $taxToPay = ($income*0.05);
    }

    return $taxToPay;
}

echo "Tax to pay: ".tax(15000);
```

Maks poeng: 10

16 Given the associative array $parents, use loops to print out the formatted string below for children who are above 11 years of age.

The string should be in the format :
(Child's name), aged (Child's age), is the (son or daughter) of (Parent's name).

Assume that the $parents array is already defined as follows, and thus you do NOT need to define it.

$parents :

```
Array
(
    [0] => Array
        (
            [name] => Thomas Smith
            [children] => Array
                (
                    [0] => Array
                        (
                            [name] => Sam
                            [gender] => male
                            [age] => 15
                        )

                    [1] => Array
                        (
                            [name] => Julie
                            [gender] => female
                            [age] => 12
                        )

                )

        )

    [1] => Array
        (
            [name] => Dwayne Johnson
            [children] => Array
                (
                    [0] => Array
                        (
                            [name] => Pauline
                            [gender] => female
                            [age] => 6
                        )

                    [1] => Array
                        (
                            [name] => Ariana
                            [gender] => female
                            [age] => 13
                        )

                )

        )

    [2] => Array
        (
            [name] => Clarke Griffin
            [children] => Array
                (
                    [0] => Array
                        (
                            [name] => Madi
                            [gender] => female
                            [age] => 11
                        )

                )

        )

)
```

Expected Output :

```
Sam, aged 15, is the son of Thomas Smith
Julie, aged 12, is the daughter of Thomas Smith
Ariana, aged 13, is the daughter of Dwayne Johnson
```

Skriv ditt svar her

```php
foreach ($parents as $parent => $assoc) {
    foreach ($assoc as $children => $child) {

        if ($child["age"] > 11) {

            if ($child["gender"] == "male") {
                $sonOrdaughter = "son";
            } else {
                $sonOrdaughter = "daughter";
            }
            echo $child["name"] . " aged " . $child["age"] . " is the " . $sonOrdaughter . " of " .
                $assoc["name"];
            echo "\n";
        }
    }
}
```

Maks poeng: 10

17 Given a class definition named "Vehicle" with a private property named "NumOfTires" and a protected property named : "brand", perform the tasks listed below.

```
class Vehicle {
   private $NumOfTires;
   protected $brand;
}
```

(Note: In the tasks below, you may need to add new methods and properties to the Class "Vehicle", however, the initial properties defined above CANNOT be changed).

(a) Create 2 additional class definitions :

1. Class "Car" which is a subclass of the "Vehicle" class.
2. Class "Truck" which is a subclass of the "Vehicle" class.

(2 marks)

(b) Add constructors in the class definitions for "Car" and "Truck" that takes in 1 argument, and sets it to the property "brand".
(2 marks)

(c) When a "Car" object is created, the "NumOfTires" property in "Vehicle" should be set to a default value of 4. And when "Truck" object is created, the "NumOfTires" property should instead be set to a default value of 6.
(3 marks)

(d) In the "Truck" class definition, add a method which allows to modify the "NumOfTires" property. Name the method "overrideNumOfTires" and it should take only 1 argument, which is the new value for the number of Tires.
(HINT : You may need to add additional methods in the "Vehicle" class to get this to work.)
Important Requirement : All methods added in the Vehicle class should NOT be public.
(5 marks)

You may use the following code to test the first 4 steps above:

```
echo "Creating a new car object<br>";
$car1 = new Car('BMW');
echo "<pre>";print_r($car1);echo "</pre>";
echo "Creating a new truck object<br>";
$truck1 = new Truck('Volvo');
echo "<pre>";print_r($truck1);echo "</pre>";
echo "Modifying the number of Tires in truck<br>";
$truck1->overrideNumOfTires(8);
echo "<pre>";print_r($truck1);echo "</pre>";
```

Expected result :

Creating a new car object

```
Car Object
(
    [NumOfTires:Vehicle:private] => 4
    [brand:protected] => BMW
)
```

Creating a new truck object

```
Truck Object
(
    [NumOfTires:Vehicle:private] => 6
    [brand:protected] => Volvo
)
```

Modifying the number of Tires in truck

```
Truck Object
(
    [NumOfTires:Vehicle:private] => 8
    [brand:protected] => Volvo
)
```

(e) Through the use of static variables , figure out a way to keep track of number of the "Car" or "Truck" objects

being created.

(3 marks)

Expected result given the test code above :

```
Number of Cars: 1
Number of Trucks: 1
```

Your final answer must include the modified "Vehicle" class and its 2 subclasses, "Car" and "Truck".

Skriv ditt svar her

```php
<?php
class Vehicle
{
    private $NumOfTires;
    protected $brand;
    static $num_car = 0;
    static $num_truck = 0;

    protected function setNumOfTires($NumOfTires)
    {
        $this->NumOfTires = $NumOfTires;
    }

    protected function __construct()
    {
        $classType = get_class($this);
        if ($classType == "Car") {
            self::$num_car++;
        } else {
            self::$num_truck++;
        }
    }
}


class Car extends Vehicle
{
    function __construct($brand)
    {
        $this->brand = $brand;
        parent::setNumOfTires(4);
        parent::__construct();
    }
}

class Truck extends Vehicle
{
    function __construct($brand)
    {
        $this->brand = $brand;
        parent::setNumOfTires(6);
        parent::__construct();
    }

    function overrideNumOfTires($newNumbeOfTires)
    {
        parent::setNumOfTires($newNumbeOfTires);
    }
}

echo "Creating a new car object<br>";
$car1 = new Car('BMW');
echo "<pre>";
print_r($car1);
echo "</pre>";

echo "Creating a new truck object<br>";
$truck1 = new Truck('Volvo');
echo "<pre>";
print_r($truck1);
echo "</pre>";

echo "Modifying the number of Tires in truck<br>";
$truck1->overrideNumOfTires(8);
echo "<pre>";
print_r($truck1);
echo "</pre>";

echo "<br>-------------------<br>";
echo "Number of cars: " . Vehicle::$num_car . "<br>";
echo "Number of trucks: " . Vehicle::$num_truck . "<br>";
```

Maks poeng: 15

18 **PART 1 (7 marks)**

The following is an incomplete class definition for creating a select field in an html form, in a dynamic way.

```
class Select{
   private $name; //Name of the select field
   private $optionsArray; //array of options in the select field

   function __construct($name,$values){
      $this->name = $name;

      if(!is_array($values)){
         die ("Error :value is not an array.");
      }else {
         $this->optionsArray = $values;
      }
   }

   // method : create options in the select field
   private function makeOptions($value){
   }

   //method : initialize the select field
   private function makeSelect(){
   }

}
```

Complete the class definition above such that a select field can be created dynamically, from a name and an array of values(which will act as the options in the select field).
(HINT : You only need to implement the functionality of the 2 methods, "makeOptions" and "makeSelect" and possibly modify the constructor, in this exercise.)

You can use the following test code to test your Select class with different input parameters:

```
<html>
<?php
   $fruits = array("Banana","Apple","Pear");
?>

   <form>
      <?php
      $select1 = new Select("Fruits", $fruits);
      ?>
   </form>
</html>
```

You need to submit only the modified definition for the "Select" class for this part.

PART 2 (8 marks)

Create a form with the following inputs :

1. A textfield where the user can input their name.
2. A select field where the user can select their favorite planet, from the array $planets given below.
3. Another select field where the user can select their favorite car from the array $cars given below.
4. A submit button.

The form should use HTTP POST.

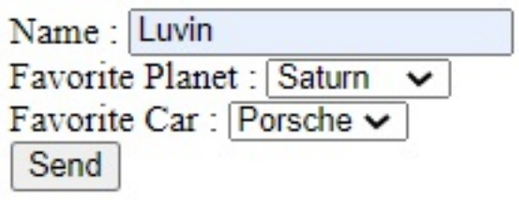
$planets = array("Mercury","Venus","Earth","Mars","Jupiter","Saturn","Uranus","Neptune");

$cars = array("BMW","Jaguar","Tesla","Ferrari","Porsche");

(Hint : Consider using instances of "Select" class in PART 1 for creating the select fields quicker. Alternatively you can also create them the normal way if you did not manage to do PART 1).

After the submit button is pressed, extract the data from the relevant superglobal and display it as follows :

Expected result :



Skriv ditt svar her

```php
//NOTE: I have done this task in two files

//FILE ONE (named "part1.php")(PART ONE)

<?php
class Select
{
    private $name; //Name of the select field
    private $optionsArray; //array of options in the select field

    function __construct($name, $values)
    {
        $this->name = $name;

        if (!is_array($values)) {
            die("Error :value is not an array.");
        } else {
            $this->optionsArray = $values;
        }
        $this->makeSelect();
    }

    // method : create options in the select field
    private function makeOptions($value)
    {
        foreach ($value as $item) {
            echo "<option value=" . $item . ">$item</option>";
        }
    }

    //method : initialize the select field
    private function makeSelect()
    {
        echo "<select name=" . $this->name . " id=" . $this->name . ">";
        $this->makeOptions($this->optionsArray);
        echo "</select>";
    }
}
?>

//FILE TWO (PART 2)
<? include "part1.php";?>

<html>
<?php
$fruits = array("Banana", "Apple", "Pear");
$planets = array("Mercury", "Venus", "Earth", "Mars", "Jupiter", "Saturn", "Uranus", "Neptune");
$cars = array("BMW", "Jaguar", "Tesla", "Ferrari", "Porsche");
?>

<form>
    <?php
    echo "select:";
    $select1 = new Select("Fruits", $fruits);
    ?>
</form>

<form action="" method="POST">
    name: <input type="text" name="name">

    <?php
    echo "<br>favorite planet:";
    $select2 = new Select("Planets", $planets);
    echo "<br>favorite car:";
    $select3 = new Select("Cars", $cars);
    ?>

    <input type="submit" name="button1" value="Send">

</form>

<?php

    if (isset($_POST['button1'])) {

        $name = $_POST['name'];
        $planet = $_POST['Planets'];
        $cars = $_POST['Cars'];

        echo $name."'s favorite car is ".$cars;
        echo "<br>";
        echo $name."'s favorite car is ".$planet;
    }
?>

</html>

//I was able to get the expected results by running the code from part 2
```

Maks poeng: 15

19 **Part 1 *(10 marks)***

Consider a database named "booklist" on a bookstore server with host address "hgws00.win.bookstore.com".

(a) Write a function named "connect" that would establish a connection to the database, you may assume that the login username and password are both "admin". The function should return a connection handle, which will be used for MySQL queries.
(2 marks)

Given the following table named "customers" on a database named "booklist".

+ Options

	username	firstname	surname	address	country
Edit Copy Delete	Edwin	Terry	Roberts	9 Foxcot Avenue, Birmingham	USA
Edit Copy Delete	EdwinTan	Edwin	Tan	Petaling Street 12	Malaysia
Edit Copy Delete	muni35	Luvin	Ragoo	10, lords Street, Manchester	Malaysia
Edit Copy Delete	PaulBet	Paul	Phoenix	9 Foxcot Avenue, Birmingham	England
Edit Copy Delete	Spiderman	Peter	Parker	41 New York St	USA
Edit Copy Delete	TheHulk	Tony	Jaa	Bangkok	Thailand
Edit Copy Delete	yumi13	Yumi	Yamaguchi	7 Samurai Rd, Osaka	Japan

(b) Write MySQL queries for the following :

1. Update the address of a customer in the "customers" table.
2. Retrieve the list of customers that are from the USA.
3. Delete erroneous entries, where the customers used a Marvel character as username. (Marvel characters in this case, are Spiderman and TheHulk).

Note : username is the primary key in the table "customers".
(6 marks)

(c) Which PHP function is used to execute a query, like those in (b) ? *(1 mark)*
(d) Which PHP function is used to extract the result of a query into an associative array? *(1 mark)*

PART 2 *(5 marks)*

Given the following form for customer login :

```
<html>
<form method="post">
Username : <input type="text" name="username" value=""> <br>
Password : <input type="password" name="password" value=""><br>
<input type="submit" name="login" value="Login">
</form>
</html>
```

(a) Show the precautionary steps you would take to protect against HTML and MySQL injection.
(b) Show how you would check if the input password matches the one stored on the database. (Assume that the stored database password for that user was already retrieved and is stored in the a variable named "hashed_password").

Fill in your answer here, separate the different parts with comments.

```php
//PART 1 - A
<?php

function connect()
{

    $host = 'hgws00.win.bookstore.com';
    $username = 'admin';
    $password = 'admin';
    $database = 'booklist';

    $connection = mysqli_connect($host, $username, $password, $database);

    if ($connection) {
```

```
        echo "We are connected<br>";
    } else {
        die("Database connection failed");
    }

    return $connection;
}
?>

//PART 1 - B.1
<?php
$query = 'UPDATE booklist SET `address` ="Your new address here" WHERE country="USA"';

$result = mysqli_query(connect(), $query);
if(!$result){
    die("Query Failed!" . mysqli_error($connection));
}else {
    echo "Entry Updated!<br>";
}
mysqli_close($connect());
?>

//PART 1 - B.2
<?php
$query = 'SELECT * FROM customers WHERE country="USA"';

$result = mysqli_query(connect(), $query);
if (!$result) {
    die("Query Failed!" . mysqli_error($connection));
} else {
    echo "Entries Retrieved!<br>";
}
while ($row = mysqli_fetch_assoc($result)) {
    print_r($row);
    echo "<br>";
}

mysqli_close($connection);
?>

//PART 1 - B.3
<?php
$query = 'DELETE FROM customers WHERE username = "Spiderman" OR code="TheHulk"';

$result = mysqli_query(connect(), $query);
if (!$result) {
    die("Query Failed!" . mysqli_error($connection));
} else {
    echo "Entry deleted!<br>";
}
while ($row = mysqli_fetch_assoc($result)) {
    print_r($row);
    echo "<br>";
}

mysqli_close($connection);
?>

//PART 1 - C
The PHP function used to query the database is the "mysqli_query(connection, query)" function.

//PART 1 - D
The PHP function used to extract the result of a query into an associative array is the
    "mysqli_fetch_assoc(result)" function.


//-------------------------------------------------------------------------
//PART 2 - A

if (isset($_POST['login'])) {

    $username = fix_string($_POST['username'],$connection);
    $password = fix_string($_POST['password'],$connection);

    function fix_string($input,$connection){
        $input = mysqli_real_escape_string($connection, $input);
        $input = htmlentities($input);
        return $input;
        }

}

//PART 2 - B
To check if a password is correct, I would use the "password_verify" function:

if (password_verify($_POST['password'],$hashed_password )) {
    echo "password match: you are logged in";
} else {
    echo "password did not match.";
}
```

```
106
107
108
109
110
111
112
```

Maks poeng: 15

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