

CROSS RIVER UNIVERSITY OF TECHNOLOGY, CALABAR
DEPARTMENT OF COMPUTER SCIENCE
2018/2019 SECOND SEMESTER EXAMINATION
CSC 2201: COMPUTER PROGRAMMING II. TIME: 2 HOURS

INSTRUCTIONS: Attempt THREE Questions: Two from Questions 1 through 3. TWO from Questions 4 through 6

Question 1

- a. Define the term **Structured Programming**.
- b. What four aspects of a program are 'structured' using this approach?

Question 2

- a. **Explain briefly and clearly**, the concept of modularization in Structured Programming.
- b. Control structures regulate how a program executes. **Briefly explain** iterative control structures.

Question 3

- a. What two concepts must the programmer deal with in writing programs?
(To make this clearer, think about "what two things are programs made of?")
- b. Describe (i.e. name and explain) TWO guidelines to good programming style.

Question 4

- a. Write a simple function login (\$username, \$password) to return a Boolean value which can apply within the following code:

```
$user = readline ("Username");  
$pass = readline ("Password");  
If (!login ($user, $pass)) exist ("Login failed");  
Print "Login Successful"
```

The function will make use of this array:

```
$validUsers = [  
    "cronaldo" => "a password"  
    "warooney" => "is meant to be"  
    "lemessi" => "a secret, but..."  
];
```

to search to see if the user credentials passed to it march any \$validUsers entries. To find if a value is in an array, call this function: in_array (\$value, \$array); to find a key of the array, use this function: array_key_exists (\$key, \$array).

- b. Define the kind of array \$validUsers is.

Question 5

- a. Write PHP code for a function gcd (\$a, \$b) to determine the greatest common divisor between two integers, \$a and \$b.
- b. In order to accommodate an unknown number of variables, PHP uses the ellipsis operator (...) – those are three dots there – with function parameters, like this:

```
Function functionName (...$parameters) {
// code goes here
}
```

Write code for a new form of the god() function, but this time using the ellipsis operator to define that function as follows:

```
Function gcd (...$numbers) {
    // your code goes here
    // but write out the entire function
    // do not repeat these comments, write out your own
    // they are important
    // NOTE the default GCD is 1
}
```

- c. Why do we use comments in programs?

Question 6

Using Newton's Method, the square root x of a number a can be derived iteratively using the formula:

$$x_{n+1} = x_n \left(\frac{x_n^2 - a}{2x_n} \right)$$

- a. Write a function newtonSqrt (\$a) in PHP to implement the numerical method shown above and return the value of a variable \$x for which thee w, as follows, given the conditions in the comments:

```
Function newtonSqrt ($a) {
    // your code goes here
    // but write out the entire function
    // once again, do not repeat these comments, write out your own
    // they are important
    // use an array $x, so $x [$n] can denote the variable x_n
    // return a root once $x [$n + 1] - $x [$n] < 0.005
}
```

- b. Name and describe the following constructs within the program:
 - a. two control structures
 - b. one data structures

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INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS

Q.1 a) Given that: `$b = 45; $a = 25; $c = 66; $colors = array ("red", "green", "blue");`
`$mail = 'user@yahoo.com'; $new = strstr($email, '@');`
`$test1 = var_dump($a>$b)? $a: $b==$c); $test2 = ($c> $a > $b)? "true"; "false"; and`
`$d = $b + $a == $c;`

With detailed explanations, find the values returned by each of the following statements?

- i) `echo $test1;` ii) `echo $test2;` iii) `print ("$d");` iv) `echo $colors[2];` v) `print ("$new");`
b) List six characteristic of valid variables in PHP.

Q.2 a) Why was PHP developed, and what 3 vital components must be installed on your computer before getting started with it.

- b. What are four error types in PHP and how do they differ?
c. Distinguish between a Static and a Dynamic Web site?

Q.3 a) What are the 4 scope levels available in PHP and how would you define them?

- b. Distinguish between the following statements in PHP:
(i) `echo` and `print` (ii) `break` and `continue`
c. Write a simple PHP program to assign your names to different variables and display them in one line.

Q.4 a) Name and discuss 3 kinds of arrays in PHP

- b. Write a script which reads 5 items chosen by you into an array, have the code output these items to the web page.

Q.5 a) If `$x = 5 + sum of the digits of your Matric No`, what is the final value of `M` after the PHP program segment below is executed?

```
$m = $x + 2;
$k = 3;
do
{
    $m = $m + $k;
    $k+=2;
} while ($k <=11);
$m *= 2;
```

- b. Name four looping constructs in PHP and discuss the syntax of each one.

Q.6 a) Name 4 conditional statement in PHP and discuss the syntax of each of them

- b. Using the full facilities of any of these conditional statement, write a simple PHP script to display the day of the week (either Monday, Tuesday, Wednesday, Thursday, Friday, Saturday or Sunday).

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INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS

Q.1 a) Study the following program and answer the questions that follows

```
<?php
$kk = 0
do {
    $i = 3;
    $kk = $j + 2;
    Print("$j ");
} while ($j<=5);
echo ("Output is: $kk");
?>
```

- i) What is the purpose of the program?
ii) Write down the outputs from the program.

b. Given that: \$b = 30; \$a = 15; \$c = 45; \$cars = array ("Volvo", BMW", Toyota");
 \$email = 'user@yahoo.com'; \$new = strstr(\$email, '@');
 \$test = var_dump(\$a>\$b)? \$a: \$b == \$c);(\$test2= (\$c>\$a>\$b)? "true"; "false";
and
 \$d = \$b + \$a == \$c;

With detailed explanations, find the values returned by each of the following statements?

- i) echo \$test1; ii) echo \$test2; iii) print("\$d"); iv) echo \$car[2]; v) print (" \$new");
c. Write a simple PHP program to compute:

$$sum = \sum_{k=1}^{20} (k^2 - 5k + 6)$$

Q.2 a) Where is PHP basically used? Name 5 important reasons why many companies are switching their current business language to PHP.

b) Why is PHP called an embedded scripting language? Hence write an embedded PHP script to output the sum, difference, product, quotient and remainder of two integers, m and n.

Q.3 a) Demonstrate the use of the *switch* and *break* statements to select and output **Red, White** or **Blue** colors on the web page.

b) Determine, with reasons, the outputs of the script below:

```
<?php
$txt1 = "Hello world";
$txt2 = "What a nice day";
echo $txt1 . " " . $txt2;
echo strlen("txt1");
echo strpos("Hello world!", "world");
?>
```

Q.4 a) Name and discuss 3 kinds of arrays in PHP.

b) Write a simple PHP program using any looping construct to output the sum of the sequence of numbers 3, 5, 7, 9, 11 on a web page.

Q.5 a) What is looping? Name four looping constructs in PHP and discuss the syntax of each one.

b) Write a script which reads 5 items chosen by you into an array, have the code output these items to the web page.

Q.6 a) What is the difference between the break and continue statements in PHP?

b) Using the if...else statement, write a simple PHP script to display the taxes payable by an employee of a company according to the rule below:

if the worker's salary is below ₦5,000.00 then the tax payable is 5% of the salary;
otherwise, the tax payable is 10% of the salary.