

Midterm 4 Review: CSE216 –Programming Abstractions

Software testing

A. State at least 4 factors responsible the failure of software projects.

- Unrealistic or unarticulated project goals
- Inaccurate estimates of needed resources
- Badly defined system requirements
- Poor reporting of the project's status
- Unmanaged risks
- Poor communication among customers, developers, and users
- Use of immature technology
- Inability to handle the project's complexity
- Sloppy development practices
- Poor project management
- Stakeholder politics
- Commercial pressures

B. What is boundary conditions testing? Write at least 5 boundary conditions testing test cases (some of them should be error test cases) for the NextDate problem described as follows:

The NextDate problem is a function of three variables: day, month and year. Upon the input of a certain date it returns the date of the day after that of the input. The input variables have the obvious conditions:

$1 \leq \text{Day} \leq 31$.

$1 \leq \text{month} \leq 12$.

$1818 \leq \text{Year} \leq 2018$.

A boundary condition is an input that is “one away” from producing a different behavior in the program code.

<u>month</u>	<u>day</u>	<u>year</u>
min = 1	min = 1	min = 1812
min+ = 2	min+ = 2	min+ = 1813
nom = 6	nom = 15	nom = 1912
max- = 11	max- = 30	max- = 2011
max = 12	max = 31	max = 2012

Boundary Value Analysis Test Cases				
Case	month	day	year	Expected Output
1	6	15	1812	June 16, 1812
2	6	15	1813	June 16, 1813
3	6	15	1912	June 16, 1912
4	6	15	2011	June 16, 2011
5	6	15	2012	June 16, 2012
6	6	1	1912	June 2, 1912
7	6	2	1912	June 3, 1912
8	6	30	1912	July 1, 1912
9	6	31	1912	error
10	1	15	1912	January 16, 1912
11	2	15	1912	February 16, 1912
12	11	15	1912	November 16, 1912
13	12	15	1912	December 16, 1912

C. What is the difference between load and performance testing? Briefly explain at least three features of Apache JMeter tool.

The objective of the performance testing is to check whether an application loads/updates within stipulated time limit (say 2 seconds). It uses metrics like response time, Requests per second. It is carried out under production - like load conditions.

The objective of load testing is to check scalability of the system. For example, finding out the maximum number of users supported by the system within certain specifications.

Apache JMeter is an open source application tool designed to load test functional behavior and measure performance on static pages, dynamic resources, and web applications. It can be used to simulate a heavy load on a server or group of servers, database, or network to test its strength, or to analyze overall performance under different load types.

JUnit and Python Unit

A. What is the purpose of each of the following JUnit 4 annotations?

@Test	Identifies a method as a test method.
@Before	Executed before each test. It is used to prepare the test environment (e.g., read input data, initialize the class).
@After	Executed after each test. It is used to cleanup the test environment (e.g., delete temporary data, restore defaults). It can also save memory by cleaning up expensive memory structures.
@BeforeClass	Executed once, before the start of all tests. It is used to perform time intensive activities, for example, to connect to a database. Methods marked with this annotation need to be defined as static to work with JUnit.
@AfterClass	Executed once, after all tests have been finished. It is used to perform clean-up activities, for example, to disconnect from a database. Methods annotated with this annotation need to be defined as static to work with JUnit.

B. What Is A “unittest” In Python?

Answer: The unit testing framework of Python is known as “unittest”. It supports the sharing of setups, automation testing, shutdown code for tests, aggregation of tests into collections, among others.

C. A Calculation class has a GCD(int, int) method to find a Greatest Common Divisor (GCD) of two numbers. Write a JUnit test class with at least one testcase that includes at least three assertions to test the GCD method.

```
public class MyTests {

    @Test
    public void GCDTest() {
        Calculation tester = new Calculation(); // MyClass is tested

        // assert statements
        assertEquals(0, tester.GCD(30, 45), 15);
        assertEquals(0, tester.GCD(20, 15), 5);
        assertEquals(0, tester.GCD(60, 30), 30);
    }
}
```

D. A Calculation class has a multiply(int, int) method. Write a JUnit test class with at least one testcase that includes at least three assertions to test the multiply method.

```
public class MyTests {

    @Test
    public void multiplicationOfZeroIntegersShouldReturnZero() {
        Calculation tester = new Calculation(); // MyClass is tested
        // assert statements
        assertEquals(0, tester.multiply(10, 0), "10 x 0 must be 0");
        assertEquals(0, tester.multiply(0, 10), "0 x 10 must be 0");
        assertEquals(0, tester.multiply(0, 0), "0 x 0 must be 0");
    }
}
```

JavaScript

Multiple choice questions (MCQ)

1. What is the HTML tag under which one can write the JavaScript code?

- A) <javascript>
- B) <scripted>
- C) <script>
- D) <js>

2. Choose the correct JavaScript syntax to change the content of the following HTML code.

```
<p id="txt">Programming Abstractions</p>
```

- A) document.getElementById("txt").innerHTML="Cool course!!";
- B) document.getElementById("txt").innerHTML=" Cool course!!";
- C) document.getId("txt")=" Cool course!!";
- D) document.getElementById("txt").innerHTML= Cool course!!;

3. Which of the following is the correct syntax to display "Agile programming" in an alert box using JavaScript?

- A) alertbox("Agile programming");
- B) msg("Agile programming");
- C) msgbox("Agile programming");
- D) alert("Agile programming");

4. What is the correct syntax for referring to an external script called "data.js"?

- A) <script src="data.js">
- B) <script href="data.js">
- C) <script ref="data.js">
- D) <script name="data.js">

5. What is the output of the following JavaScript code?

```
<script type="text/javascript" language="javascript">
var x=5;
var y=6;
var res=eval("x*y");
document.write(res);
</script>
```

- A) "30"
- B) 30
- C) 5*6
- D) "5*6"

6. Which of the following is correct syntax to initialize an array in JavaScript?

- A) `var universities = "SUNYK", "GUGC", "GMU"`
- B) `var universities = (1:SUNYK, 2:GUGC, 3:GMU)`
- C) `var universities = (1=SUNYK, 2=GUGC, 3=GMU)`
- D) `var universities = ["SUNYK", "GUGC", "GMU"]`

7. What is the output of the following JavaScript code?

```
<script>
document.write(typeof(24.49));
</script>
```

- A) float
- B) number
- C) integer
- D) double

8. JavaScript is _____ language.

- A) a compiled
- B) an interpreted

9. Given that `x = 5`, what is the result of invoking following statements?

`x == "5"` true/false

`x === "5"` true/false

10. What will be the output of the following JavaScript code?

```
<HTML> <body>
<p id="demo"></p>
<script>
var x = 10;
var y = 2;
var z = x / y;
document.getElementById("demo").innerHTML = z;
</script>
</body> </HTML>
```

- a) 0
- b) 1
- c) 2
- d) 5

11. What will be the output of the following JavaScript code?

```
<HTML> <body>
<p id="demo"></p>
<script>
txt1 = "Cheer";
txt1 += "up!";
document.getElementById("demo").innerHTML = txt1;
</script>
</body> </HTML>
```

- a) Cheerup!
- b) Cheer up!
- c) up! Cheer
- d) up!Cheer

12. The statement `x===y` refers to _____

- a) Both x and y are equal in value, type and reference address
- b) Both x and y are equal in value
- c) Both x and y are equal in value and type
- d) There is no such statement

13. What will be the output of the following JavaScript code?

```
function equalto()
{
    var num=10;
    if(num=="20")
        return true;
    else
        return false;
}
console.log(equalto())
```

- a) true
- b) false
- c) runtime error
- d) compilation error

14. What will be the output of the following JavaScript code?

```
function mystery()
{
    var a=1;
    if(a!=null)
        return 1;
    else
        return 0;
}
console.log(mystery())
```

- a) 1
- b) 0

- c) runtime error
- d) compiler error

15. Consider the following JavaScript statements.

```
var sentence = "Life is precious!!"; // Sample text
var pattern = /\d+/g // Matches all instances of one or more digits
```

In order to check if the pattern matches with the string represented by variable sentence, the statement is _____

- a) sentence==pattern
- b) pattern.test(text)
- c) sentence.test(pattern)
- d) pattern.test(sentence)

16. What kind of expression is "new Rectangle(5,6)"?

- a) Primary Expression
- b) Object Creation Expression
- c) Invocation Expression
- d) Constructor Calling Expression

17. What will be the output of the following JavaScript code?

```
function output(option)
{
    return (option ? "yes" : "no");
}
var ans=false;
console.log(output(ans));
```

- a) yes
- b) no
- c) Runtime error
- d) Compilation error

18. What will be the output of the following JavaScript code?

```
function height()
{
    var height = 155;
    var type = (height < 180) ? "tall" : "short";
    return type;
}
console.log(height())
```

- a) 155
- b) 180
- c) tall
- d) short

19. What will be the output of the following JavaScript code?

```
var grade='B';
var result= "";
switch(grade)
{
    case 'A':
    {
        result+="4";
        break;
    }
    case 'B':
    {
        result+="3";
        break;
    }
    case 'C':
    {
        result+="2";
        break;
    }
    default:
        result+="1";
}
console.log(result);
```

- a) 4
- b) 3
- c) 2
- d) 1

20. What will be the output of the following JavaScript code?

```
var a=10;
var b=8;
var c=6;
if(a==b)
    console.log(a);
else if(a==c)
    console.log(a);
else
    console.log(c);
```

- a) 10
- b) 6
- c) Error
- d) 8

21. What will be the output of the following JavaScript code?

```
var grade='A';
var result=0;
switch(grade)
{
    case 'A':
        result+=4;
    case 'B':
        result+=3;
    case 'C':
        result+=2;
    default:
```



```
        result+=1;
    }
    console.log(result);
a) 10
b) 27
c) 8
d) 0
```

Short answer questions

1. Are JavaScript functions and variable names case-sensitive or case-insensitive?

JavaScript functions and variable name are case-sensitive. The variables Count, count, and COUNT are all different.

2. By default, to which part of a document will JavaScript code output?

By default, JavaScript code will output to the part of the document in which it resides. If it's in the head, it will output to the head; if in the body, it outputs to the body.

3. How can you include JavaScript code from another source in your documents?

You can include JavaScript code from other files in your documents by either copying and pasting them or, more commonly, including them as part of a `<script src='filename.js'>` tag.

4. Which JavaScript function is the equivalent of echo or print in PHP?

The equivalent of the echo and print commands used in PHP is the JavaScript `document.write` function (or method).

5. What characters are used to define a JavaScript variable name?

Unlike PHP, no character is used (such as `$`) to define a JavaScript variable name. JavaScript variable names can start with and contain uppercase and lowercase letters as well as underscores; names can also include digits, but not as the first character.

6. When would you use the `===` (identity) operator?

You use the identity operator when you wish to bypass JavaScript's automatic operand type changing.

7. What is the best way to force your own operator precedence?

The best way to force your own operator precedence is to surround the parts of an expression to be evaluated first with parentheses.

8. What keyword is used to create an object?

New objects are created via the `new` keyword.

9. Name a way to return multiple values from a function.

One way to return multiple values from a function is to place them all inside an array and return the array.

10. What JavaScript method can you use to send a form for validation prior to submitting it?

You can send a form for validation prior to submitting it by adding the Java-Script onsubmit attribute to the <form> tag. Make sure that your function returns true if the form is to be submitted, and false otherwise.

11. Write a regular expression to match either of the words hot or hit.

A regular expression to match either of the words hot or hit could be /h[oi]t/.

12. Using regular expressions, write a JavaScript function to test whether the word make exists in the String "Adversity and loss make a man wise".

A JavaScript function using regular expressions to test whether the word fox exists in the string The quick brown fox could be as follows: `document.write(/make/.test("Adversity and loss make a man wise"))`