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**SEMESTER 1, 2019 EXAMINATIONS****CITS3403****Physics, Mathematics & Computing****Agile Web Development**Department of Computer Science & Software  
EngineeringThis paper contains: **23 Pages (including title page)**Time Allowed: **2:00** hours

This paper contains 10 questions, worth 5 marks each.

Candidates should attempt all questions, in the spaces provided in the question book.

The last three pages are references which may be removed from the paper.

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1. (5 marks)

Define the following terms and explain their specific role in exposing a web application to a user via a web browser.

- HTML
  - CSS
  - Javascript
  - Cookies
  - HTTP requests/responses
-

2. (5 marks)

Given the following HTML code describe the style that is applied to the table.

```
<html>
<head>
  <meta charset='UTF-8' />
  <style>
    table, td, th {
      border: 1px solid black;
    }

    .even {
      background-color: blue;
    }

    table td + td{
      font-style: italic;
    }

    #warning{
      background-color: red;
      font-weight:bold;
    }

    td:hover{
      border: 2px solid green;
    }
  </style>
</head>
<body>
  <table>
    <tr class='even'><th>A</th><th>B</th><th>C</th></tr>
    <tr><td>1</td><td>2</td><td>3</td></tr>
    <tr class='even'><td>i</td><td>ii</td><td id='warning'>iii</td></tr>
  </table>
</body>
</html>
```



3. (5 marks)

Provide a javascript functions to transpose every table in a web page. For example, in Figure 1 we can see a table before and after it is transposed.

<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thur</b>	<b>Fri</b>	<b>Mon</b>	Bill	Michael
Bill	Joanne	David	Michelle	Agnes	<b>Tue</b>	Joanne	
Michael		Arthur	Janet	John	<b>Wed</b>	David	Arthur
					<b>Thur</b>	Michelle	Janet
					<b>Fri</b>	Agnes	John

Figure 1: A table before and after it is transposed.

*Hint: HTML elements have an attribute called `children` that contains a collection of the children of the element.*



4. (5 marks)

Explain the difference between sever side rendering of a web page with flask and client side rendering using a REST API, AJAX and jQuery. Describe the advantages and disadvantages of each approach.



5. (5 marks)

Suppose that you are writing a web application called *BucketList* where users can publish a list of things they would like to do before they die. For each user there is a list of things to do, with a checkbox indicating whether or not they have done it yet. Other users can see the list and provide a comment on the list items.

Propose a set of models to represent the data entities in this application. You do not have to present them fully in python, and you are not required to specify imports and methods. However the types of fields and relations between the models should be clear.



6. (5 marks)

Given the *BucketList* application described in Question 5, sketch a wire-frame mock of a users page which shows their name, the items on their bucket list, and any comments other users have made.

Write a Jinja template to render the mock you have drawn. State any assumptions you require.



7. (5 marks)

Describe the directory structure of a typical Flask project, and highlight the roles of the main files.

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8. (5 marks)

Give the six key architectural constraints of the REST software architecture, and give a short description of each constraint.

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9. (5 marks)

Define the following terms in the context of software testing:

- Fixtures
  - Assert
  - Stub
  - Selenium
  - Coverage
-

10. (5 marks)

Describe the main activities of an agile web development process, in the context of a web development project. Particularly, highlight

- (a) the different roles people have in the project,
- (b) how the application requirements are gathered and maintained,
- (c) how the project is divided into stages
- (d) how source code is shared, and
- (e) how the correct operation of the application is ensured.



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End of Paper

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## HTML5 NEW TAG

### TAG NOT SUPPORTED IN HTML 5

<b>&lt;i--...--&gt;</b>	Define a comment
<b>&lt;!DOCTYPE&gt;</b>	Defines the document type
<b>&lt;a&gt;</b>	Defines a hyperlink href, hreflang, media, ping, rel, target, type
<b>&lt;abbr&gt;</b>	Defines an abbreviation
<b>&lt;acronym&gt;</b>	Used to define an embedded acronym
<b>&lt;address&gt;</b>	Defines an address element
<b>&lt;applet&gt;</b>	Used to define an embedded applet
<b>&lt;area&gt;</b>	Defines an area inside an image map alt, coords, href, hreflang, media, ping, rel, shape, target, type
<b>&lt;article&gt;</b>	Defines an article cite, pubdate
<b>&lt;aside&gt;</b>	Defines content aside from the page content
<b>&lt;audio&gt;</b>	Defines sound content autobuffer, autoplay, controls, src
<b>&lt;b&gt;</b>	Defines bold text
<b>&lt;base&gt;</b>	Defines a base URL for all the links in a page href, target
<b>&lt;basefont&gt;</b>	Used to define a default font-color, font-size, or font-family for all the document
<b>&lt;bdo&gt;</b>	Defines the direction of text display
<b>&lt;big&gt;</b>	Used to make text bigger
<b>&lt;blockquote&gt;</b>	Defines a long quotation cite
<b>&lt;body&gt;</b>	Defines the body element
<b>&lt;br&gt;</b>	Inserts a single line break Defines a push button autofocus, disabled, form, formaction, formenctype, formmethod, formnovalidate, formtarget, name, type, value
<b>&lt;canvas&gt;</b>	Defines graphics height, width
<b>&lt;caption&gt;</b>	Defines a table caption
<b>&lt;center&gt;</b>	Used to center align text and content
<b>&lt;cite&gt;</b>	Defines a citation
<b>&lt;code&gt;</b>	Defines computer code text autobuffer, autoplay, controls, src
<b>&lt;col&gt;</b>	Defines attributes for table columns
<b>&lt;colgroup&gt;</b>	Defines groups of table columns span
<b>&lt;command&gt;</b>	Defines a command button checked, disabled, icon, label, radiogroup, type

<b>&lt;datalist&gt;</b>	Defines a dropdown list
<b>&lt;dd&gt;</b>	Defines a definition description
<b>&lt;del&gt;</b>	Defines deleted text cite, datetime
<b>&lt;details&gt;</b>	Defines details of an element open
<b>&lt;dialog&gt;</b>	Defines a dialog (conversation)
<b>&lt;dfn&gt;</b>	Defines a definition term
<b>&lt;dir&gt;</b>	Used to define a directory list
<b>&lt;div&gt;</b>	Defines a section in a document
<b>&lt;dl&gt;</b>	Defines a definition list
<b>&lt;dt&gt;</b>	Defines a definition term
<b>&lt;em&gt;</b>	Defines emphasized text
<b>&lt;embed&gt;</b>	Defines external interactive content or plugin height, src, type, width
<b>&lt;fieldset&gt;</b>	Defines a fieldset disabled, form, name
<b>&lt;figure&gt;</b>	Defines a group of media content, and their caption
<b>&lt;font&gt;</b>	Used to define font face, font size, and font color of text
<b>&lt;footer&gt;</b>	Defines a footer for a section or page Defines a form accept-charset, action, autocomplete, enctype, method, name, novalidate, target
<b>&lt;frame&gt;</b>	Used to define one particular window (frame) within a frameset
<b>&lt;frameset&gt;</b>	Used to define a frameset, which organized multiple windows (frames)
<b>&lt;h1&gt; to &lt;h6&gt;</b>	Defines header 1 to header 6
<b>&lt;head&gt;</b>	Defines information about the document
<b>&lt;header&gt;</b>	Defines a header for a section or page
<b>&lt;hgroup&gt;</b>	Defines information about a section in a document
<b>&lt;hr&gt;</b>	Defines a horizontal rule
<b>&lt;html&gt;</b>	Defines an html document manifest, xhtml
<b>&lt;i&gt;</b>	Defines italic text
<b>&lt;iframe&gt;</b>	Defines an inline sub window height, name, sandbox, seamless, src, width
<b>&lt;img&gt;</b>	Defines an image alt, src, height, ismap, usemap, width
<b>&lt;input&gt;</b>	Defines an input field accept, alt, autocomplete, autofocus, checked, disabled, form, formaction, formenctype, formmethod, formnovalidate, formtarget, height, list, max, maxlength, min, multiple, name, pattern, placeholder, readonly, required, size, src, step, type, value, width

<b>&lt;samp&gt;</b>	Defines sample computer code
<b>&lt;script&gt;</b>	Defines a definition list async, type, charset, defer, src
<b>&lt;section&gt;</b>	Defines a section cite
<b>&lt;select&gt;</b>	Defines a selectable list autofocus, disabled, form, multiple, name, size
<b>&lt;small&gt;</b>	Defines small text
<b>&lt;source&gt;</b>	Defines media resources media, src, type
<b>&lt;span&gt;</b>	Defines a section in a document
<b>&lt;strong&gt;</b>	Defines strong text
<b>&lt;style&gt;</b>	Defines a style definition type, media, scoped
<b>&lt;sub&gt;, &lt;sup&gt;</b>	Defines sub/super-scripted text
<b>&lt;table&gt;</b>	Defines a table summary
<b>&lt;tbody&gt;</b>	Defines a table body summary
<b>&lt;td&gt;</b>	Defines a table cell colspan, headers, rowspan
<b>&lt;textarea&gt;</b>	Defines a text area autofocus, cols, disabled, form, maxlength, name, placeholder, readonly, required, rows, wrap
<b>&lt;tfoot&gt;, &lt;thead&gt;</b>	Defines a table footer / head
<b>&lt;th&gt;</b>	Defines a table header colspan, headers, rowspan, scope
<b>&lt;time&gt;</b>	Defines a date/time datetime
<b>&lt;title&gt;</b>	Defines the document title
<b>&lt;tr&gt;</b>	Defines a table row datetime
<b>&lt;tt&gt;</b>	Used to define teletype text
<b>&lt;u&gt;</b>	Used to define underlined text
<b>&lt;ul&gt;</b>	Defines an unordered list
<b>&lt;var&gt;</b>	Defines a variable
<b>&lt;video&gt;</b>	Defines a video autobuffer, autoplay, controls, height, loop, src, width

## HTML5 TAG CHEAT SHEET

Created by [Websitesetup.org](https://websitesetup.org)

# CSS CHEAT SHEET

## Shorthand\*

background  
border  
border-bottom  
border-left  
border-right  
border-top  
font  
list-style  
margin  
padding

## Comments

/\* Comment \*/

## Pseudo Selectors

:hover  
:active  
:focus  
:link  
:visited  
:first-line  
:first-letter

## Media Types

all  
braille  
embossed  
handheld  
print  
projection  
screen  
speech  
tty  
tv

## Units

Length %  
em  
pt  
px  
Keywords  
bolder  
lighter  
larger

## SYNTAX

### Syntax

selector {property: value;}

### External Style Sheet

```
<link rel="stylesheet" type="text/css" href="style.css" />
```

### Internal Style

```
<style type="text/css">
selector {property: value;}
</style>
```

### Inline Style

```
<tag style="property: value">
```

## GENERAL

Class	String preceded by a period
ID	String preceded by a hash mark
div	Formats structure or block of text
span	Inline formatting
color	Foreground color
cursor	Appearance of the cursor
display	block; inline; list-item; none
overflow	How content overflowing its box is handled visible; hidden; scroll; auto
visibility	visible; hidden

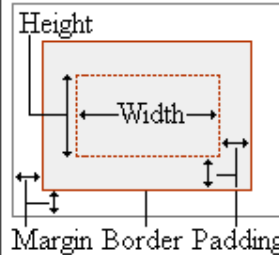
## FONT

font-style	Italic, normal
font-variant	normal, small-caps
font-weight	bold, normal, lighter, bolder, integer (100-900)
font-size	Size of the font
font-family	Specific font(s) to be used

## TEXT

letter-spacing	Space between letters
line-height	Vertical distance between baselines
text-align	Horizontal alignment
text-decoration	blink, line-through, none, overline, underline
text-indent	First line indentation
text-transform	capitalize, lowercase, uppercase
vertical-align	Vertical alignment
word-spacing	Spacing between words

## BOX MODEL



height; width; margin-top;  
margin-right; margin-bottom;  
margin-left; padding-top;  
padding-right; padding-bottom;  
padding-left;

## BORDER

border-width Width of the border

border-style dashed; dotted; double; groove; inset; outset; ridge; solid; none

border-color Color of the border

## POSITION

clear Any floating elements around the element?  
both, left, right, none

float Floats to a specified side  
left, right, none

left The left position of an element  
auto, length values (pt, in, cm, px)

top The top position of an element  
auto, length values (pt, in, cm, px)

position static, relative, absolute

z-index Element above or below overlapping elements?  
auto, integer (higher numbers on top)

## BACKGROUND

background-color Background color

background-image Background image

background-repeat repeat, no-repeat, repeat-x, repeat-y

background-attachment Background image scroll with the element?  
scroll, fixed

background-position (x y), top, center, bottom, left, right

## LIST

list-style-type Type of bullet or numbering in the list  
disc; circle; square; decimal; lower-roman; upper-roman; lower-alpha; upper-alpha; none

list-style-position Position of the bullet or number in a list  
inside; outside

list-style-image Image to be used as the bullet in a list

\* The properties for each selector are in the order they should appear when using shorthand notation.

## Methods

### Object

toString  
toLocaleString  
valueOf  
hasOwnProperty  
isPrototypeOf  
propertyIsEnumerable

### String

charAt  
charCodeAt  
fromCharCode  
concat  
indexOf  
lastIndexOf  
localeCompare  
match  
replace  
search  
slice  
split  
substring  
substr  
toLowerCase  
toUpperCase  
toLocaleLowerCase  
toLocaleUpperCase

### RegExp

test  
match  
exec

### Array

concat  
join  
push  
pop  
reverse  
shift  
slice  
sort  
splice  
unshift

### Number

toFixed  
toExponential  
toPrecision

### Date

parse  
toDate  
toISOString  
getDate  
getDay  
getFullYear  
getHours  
getMilliseconds  
getMinutes  
getMonth  
getSeconds  
getTime  
getTimezoneOffset  
getYear  
setDate  
setHours  
setMilliseconds  
setMinutes  
setMonth  
setSeconds  
setYear  
toLocaleTimeString

# JavaScript

## XMLHttpRequest

### Safari, Mozilla, Opera:

```
var req = new XMLHttpRequest();
```

### Internet Explorer:

```
var req = new  
ActiveXObject("Microsoft.XMLHTTP");
```

## XMLHttpRequest Object Methods

```
abort()  
getAllResponseHeaders()  
getResponseHeader(header)  
open(method, URL)  
send(body)  
setRequestHeader(header, value)
```

## XMLHttpRequest Object Properties

```
onreadystatechange  
readyState  
responseText  
responseXML  
status  
statusText
```

## XMLHttpRequest readyState Values

0	Uninitialized
1	Loading
2	Loaded
3	Interactive
4	Complete

## JAVASCRIPT IN HTML

### External JavaScript File

```
<script type="text/javascript"  
src="javascript.js"> </script>
```

### Inline JavaScript

```
<script type="text/javascript">  
<!--  
    // JavaScript Here  
//-->  
</script>
```

## Functions

### Window

```
alert  
blur  
clearTimeout  
close  
focus  
open  
print  
setTimeout
```

### Built In

```
eval  
parseInt  
parseFloat  
isNaN  
isFinite  
decodeURI  
decodeURIComponent  
encodeURIComponent  
escape  
unescape
```

## REGULAR EXPRESSIONS - FORMAT

Regular expressions in JavaScript take the form:

```
var RegEx = /pattern/modifiers;
```

## REGULAR EXPRESSIONS - MODIFIERS

/g	Global matching
/i	Case insensitive
/s	Single line mode
/m	Multi line mode

## REGULAR EXPRESSIONS - PATTERNS

^	Start of string
\$	End of string
.	Any single character
(a b)	a or b
(...)	Group section
[abc]	Item in range (a or b or c)
[^abc]	Not in range (not a or b or c)
a?	Zero or one of a
a*	Zero or more of a
a+	One or more of a
a{3}	Exactly 3 of a
a{3,}	3 or more of a
a{3,6}	Between 3 and 6 of a
!(pattern)	"Not" prefix. Apply rule when URL does not match pattern.

## EVENT HANDLERS

onAbort	onMouseDown
onBlur	onMouseMove
onChange	onMouseOut
onClick	onMouseOver
onDbClick	onMouseUp
onDragDrop	onMove
onError	onReset
onFocus	onResize
onKeyDown	onSelect
onKeyPress	onSubmit
onKeyUp	onUnload
onLoad	

## FUNCTIONS AND METHODS

A method is a type of function, associated with an object. A normal function is not associated with an object.

Available free from  
AddedBytes.com

## DOM Methods

### Document

```
clear  
createDocument  
createDocumentFragment  
createElement  
createEvent  
createEventObject  
createRange  
createTextNode  
getElementsByTagName  
getElementById  
write
```

### Node

```
addEventListener  
appendChild  
attachEvent  
cloneNode  
createTextRange  
detachEvent  
dispatchEvent  
fireEvent  
getAttributeNS  
getAttributeNode  
hasChildNodes  
hasAttribute  
hasAttributes  
insertBefore  
removeChild  
removeEventListener  
replaceChild  
scrollIntoView
```

### Form

```
submit
```

### DOM Collections

```
item
```

### Range

```
collapse  
createContextualFragment  
moveEnd  
moveStart  
parentElement  
select  
setStartBefore
```

### Style

```
getPropertyValue  
setProperty
```

### Event

```
initEvent  
preventDefault  
stopPropagation
```

### XMLSerializer

```
serializeToString
```

### XMLHTTP

```
open  
send
```

### XMLDOM

```
loadXML
```

### DOMParser

```
parseFromString
```