VICTORIA UNIVERSITY OF WELLINGTON
TE HERENGA WAKA

EXAMINATIONS – 2021

TRIMESTER 2

NWEN 304

Advanced Network Applications

Time Allowed: 50 MINUTES

CLOSED BOOK

Permitted materials: Only silent non-programmable calculators or silent programmable calculators with their memories cleared are permitted in this examination.
No electronic dictionaries are allowed.

Instructions: Attempt ALL TWENTY ONE (21) questions:

There are THREE (3) sections:

- Section A - True or False [10 marks]

- Section B - Multiple Choice [20 marks]

- Section C - short Answers [30 marks]

The examination consists of 60 marks in total.

SECTION A   True or False [10 marks (2 marks each)]

1. State True or False. Middleware services are application dependent.

    a. True

    b. False

False

2. State True or False. Moving a website from one data centre to the other is an example of location transparency.

    a. True

    b. False

False

3. State True or False. Response order is not maintained in HTTP/2.

    a. True

    b. False

True

4. Consider the following code segment.

    ```
    function callBackFn(num, callback)
    {
            callback(num);
    }
    function callback(num)
    {
        console.log(num);
    }
    callBackFn(5,callback)
    ```

    State True or False. The function call to the callback function `callback(num)` is a synchronous callback.

    a. True

    b. False

True

5. Consider the following code segment.

```
let http=require('http');
let s = http.createServer(function(req,res){

    res.writeHead(200,{'content-type':'text/plain'});
    res.write('Hello\n');

    setTimeout(()=>{res.end("world\n")},2000);
  });
s.listen(3000);
```

State True or False. During the execution of the code segment the main thread process sleeps while the function `setTimeout` executes.

   a. True

   b. False

> False

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

SECTION B   Multiple Choice [20 marks (2 marks each)]

6. Which of the following tasks are preferred to be done asynchronously, if possible?

   a. I / O
   b. Downloading a remote file
   c. API call
   d. All the above

d

7. Ability of a client to access a resource from different locations is an example of which of the following distribution transparency :

   a. Location transparency
   b. Relocation transparency
   c. Migration transparency
   d. All the above

c

8. On requesting a web page the user receives a 404 error. Who is at fault?

   a. Client
   b. Server
   c. Neither
   d. Both

a

9. Which one of the following REST constraints is optional?

   a. Server does not maintain state of any client.
   b. A uniform interface is maintained between client and server using HTTP methods and media types
   c. Clients can evolve independently as long as there are no breaking changes in the interface
   d. Server can extend client functionality based on choices made by a user

d

10. Fill in the blank. Fetch API is exposed by _____

    a. Browser

    b. Operating System

    c. HTTP protocol

    d. None of the above

a

11. Which of the following versions of HTTP protocol is built on User Datagram Protocol (UDP)?

    a. HTTP/1.1

    b. HTTP/2

    c. HTTP/3

    d. None of the above

c

12. A RESTful service uses which of the following methods to update a Database:

    a. POST

    b. PUT

    c. PUSH

    d. GET

b

13. Select all (possibily more than one) valid statements.

    a. In MVC architecture controller is the glue between the model and the view

    b. Express is a client side MVC framework

    c. Replication is an important scaling approach, however, it leads to consistency problems

    d. DOM treats an HTML Document as an array of elements

a,c

14. What will be the output of the following code segment:

```
let obj = {a:10,
           b:20,
           disp:()=>{console.log(this.a+" "+this.b)}
    }
obj.disp();
```

   a. 10 20

   b. undefined undefined

   c. Run time error

   d. None of the above

> b

15. What is the role of a rendering engine in a browser?
    - Parse HTML document to construct a DOM tree
    - Parse CSS files to create a CSSOM tree
    - Combine DOM and CSSOM trees to form a Render tree
    - All of the above

> d

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SECTION C   Short Answers [30]

16. Explain the difference between a web-service and a website? **(4 marks)**

A website serves the user web pages in the form of html pages which are interpreted and displayed in a web browser to a human user. Accessing a website typical involves sending GET request over HTTP(S).

A Web service is a web application component that uses a standardized format like XML/ jSON to interact with other web applications over the internet. A web service can respond to many different types of requests (GET, PUT, POST, DELETE etc).

Interacting with a web service can result in changing data on a remote location, getting information back regarding some data etc. Furthermore, a web service can respond in many different ways, serving data in text, XML or even an empty response.

17. List two advantages of a Resource based API over a RPC based API, giving suitable examples. **(4 marks)**

ANY 2
a) Semantics relies on HTTP verbs
b) REST is more predictable than RPC as it relies on the shared semantic of HTTP verbs.
c) Enables developing malleable software by breaking it down into components that are better isolated from each other's assumptions.
d) Allows easy integration with other systems

18. What is Head of line blocking in HTTP? Explain how HTTP/2 solves this problem.
(6 marks)

Head of Line blocking (in HTTP/1.1) refers to the fact that each HTTP client has a limited number of TCP connections to a server (usually 6 connections per hostname) and doing a new request over one of those connections has to wait for the previous request on the same connection to complete before the client can make a new request.

HTTP/2 (h2) solves the HOL issue by means of multi-plexing requests over the same TCP connection, so a client can make multiple requests to a server without having to wait for the previous ones to complete as the responses can arrive in any order.

19. What will the JavaScript code below output to the console? Explain your answer.
(4 marks)
```
console.log((function f(n)return ((n > 1) ?  n * f(n-1) :  n))(6));
```

720. Recursive function call.

20. Briefly discuss the difference between === and == in JavaScript programs. Please provide an example for each operator. **(6 marks)**

== is used for comparison between two variables irre-spective of the datatype of variable. === is also used for comparison between two variables but this will check strict type, which means it will check datatype and compare two values.

Any valid example

21. You are given the following JavaScript code segment that is expected to return
    `true` if the two argument arrays are identical. **(6 marks)**

```
function checkArrEquals(arr1, arr2) {
 if (arr1 === arr2)
   return true
else
   return false
 }
```

Given two arrays: `a = [1, 2, 3]` and `b = [1, 2, 3]`, the output obtained on
calling the function `checkArrEquals(a,b)`, however, is `false`. Explain why the
function does not give the desired results. Also, rewrite the function to correctly
check if the two arrays are equal.

> In Javascript arrays are passed by reference.
> function checkArrEquals(arr1, arr2)
> if(arr1.length != arr2.length)
> return false;
>
> for(i=0;i¡arr1.size;i++)
> if(arr1[i] === arr2[i])
> continue;
>
> else
> return false
> return true;

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