Web Development

1. Please complete the HTML/CSS/JavaScript code below for a calculator that <u>subtracts</u> two numbers with the following interface. <u>If the calculation turns out negative, the result should appear red.</u>


```
<html>
  <head>
      <style>




      </style>
      <script>













      </script>
  </head>
  <body>
    <input type='text' id='number1'> -
    <input type='text' id='number2'> =
      <span id='result'>?</span>
  </body>
</html>
```

2. Please select all true statements regarding TypeScript.

( ) TypeScript needs to be compiled to JavaScript to run in the browser.

( ) TypeScript is stricter typed than JavaScript.

( ) TypeScript sucks since it slows down development.

( ) TypeScript and JavaScript are the same.

3. Web applications always need a server.

( ) Yes, because _____

( ) No, because _____

4. Github Pages..

( ) ..allows hosting of client-side only web-applications.

( ) ..allows setting up a Jekyll CMS.

( ) ..offers essentially free webspace.

( ) ..allows you to map a .com domain to it.

5. A good web application has a server-component and a client-component.

( ) True   ( ) False

6. A HTTPS server transports content encrypted to the web-browser.

( ) True   ( ) False

7. Please select all true statements regarding Node.js.

( ) Node.js is JavaScript-based.

( ) Node.js runs on the client-side.

( ) Node.js runs on the server-side.

( ) Node.js has a ton of libraries and packages available.

( ) Github Pages supports hosting of Node.js applications.

8. Write object-oriented JavaScript code: Wrap the computational code (no UI, just logic) from 1. Inside a CalculatorLogic class with a subtract method.

Data Science

9. Complete the following Python code.

```python
%pylab inline

def get_mean_and_std(arr):

    # TODO



    return mean, std


def get_odd_numbers(arr):

    odd_numbers = []

    # TODO




    return odd_numbers


a = [1, 2, 3, 4, 5, 6]
a += range(3)
a += range(2,5)

print( get_mean_and_std(a) )
# outputs (2.75, 1.689427911059441)

print( get_odd_numbers(a) )
# outputs [1, 3, 5, 1, 3]
```
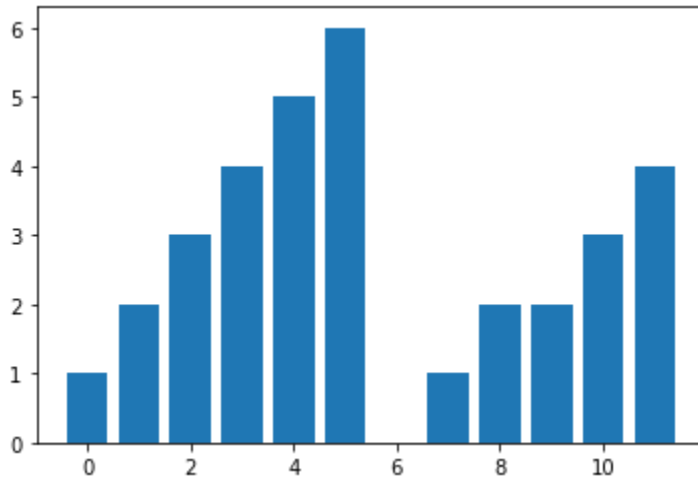
10. Which command creates the following plot based on the array 'a' from above?


```
# TODO
```

11. Please select all true statements regarding NumPy.
( ) NumPy is optimized for numerical analysis and linear algebra.
( ) NumPy is Python-native.
( ) NumPy is written in C++.
( ) The command '%pylab inline' loads NumPy in Jupyter Notebooks / colab.
( ) NumPy supports multi-dimensional arrays.
( ) All current Python-based machine learning libraries use NumPy.

12. What is the most important when dealing with training and testing data?

13. What is overfitting of a classifier in machine learning? Please select all true statements.
( ) Overfitting means that the classifier is optimized for the training set but can not generalize to other data.
( ) Overfitting means training a classifier.
( ) Overfitting can be prevented with data augmentation.
( ) Overfitting is another word for Batch Normalization.
( ) Deep neural networks do not overfit
( ) Convolutional neural networks do not overfit.

General Questions

14. You have the following tools available on a shell: telnet   ping   ssh   rsync
What is the easiest way to check if a local webserver with SSL is running?

15. In a cluster environment, all jobs should run on the head node.
( ) True   ( ) False

16. WebSockets allow persistent connection between client and server.
( ) True   ( ) False

17. Ajax allows persistent connections between client and server.
( ) True   ( ) False

18. Which open source licenses are fully permissive?
( ) BSD
( ) GNU
( ) Apache
( ) MIT
( ) CC-BY-SA
( ) CC-BY-ND

19. Grace Hopper...
( ) ..the inventor of COBOL.
( ) ..the creator of Linux.
( ) ..the person who wrote the first linker.
( ) ..discovered the first computer bug.
( ) ..worked on the Mark-2 computer with punch cards.

20. Checking in via QR Code from home or after class is an academic dishonesty violation.
( ) True   ( ) False

21. Copying code without giving credit is an academic dishonesty violation.
( ) True   ( ) False