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Written Assessment
HyperionDev Coding Mentor

www.hyperiondev.com

Welcome

We're excited to get to know you and your skills better. The next step of the interview process with HyperionDev is to complete a take-home exercise. Please complete this exercise within **5 days** of receiving it and make sure your responses are all sent through to the email address from which you received this assessment unless otherwise specified.

What is HyperionDev?

Hyperion is recognised as one of the top education technology startups in Europe, the Middle East, and Africa. Founded by Riaz Moola in 2012, Hyperion's leadership team consists of ex-Google, Amazon and PwC employees, senior team members from GetSmarter (the most valuable edtech startup in South Africa, recently acquired for >R1.5 billion) and graduates of the University of Cambridge, Cape Town, and Oxford.

Hyperion was funded by Facebook and Google in 2017 - winning first prize in Facebook's Africa Innovation Challenge Award as the top edtech startup on the African continent. Hyperion works directly with Facebook's senior leadership - right up to Mark Zuckerberg himself - and through its headquarters in London is recognised as a leading edtech startup in Europe, the Middle East, And Africa. Hyperion was recently recognised as one of the top 5 edtech startups in South Africa and is supported by top globally edtech investors including the edtech fund behind Coursera, Andela, Udemy, & SoloLearn.

We're backed by
and partnered with
Facebook and **Google**

We have built an online course platform that allows human code review to be scaled, applying this methodology to help thousands of students from over 30 countries learn how to code in a novel way. We pioneer effective and affordable

software development education with this code review model, lowering the cost of access to tech careers around the world to shrink the tech skills gap and inequality in the tech space. Please ensure you have reviewed the about us page as well.

Being a Coding Mentor at HyperionDev

As a Coding Mentor, you will be responsible for providing high-quality mentorship to our students on one or more of our courses, available on our Courses page. Our model of coding education consists of students submitting code and assignments via Dropbox which are reviewed and assessed within 24 hours by our team of on-demand, expert mentors.

HyperionDev Mentors are elite, world-leading software development educators with a skill set that is at the intersection of technical coding skills and education. Being a HyperionDev Mentor is a full-time career with a career path similar to that of a traditional educator and compensation/benefits rivalling those in the software & IT industry.

The HyperionDev Mentor programme has been endorsed by the South African government, and working with Google we've designed a first-in-the-world training programme to train school educators or those in the tech space to transition to the career of HyperionDev Mentor.

Instructions

- You may also access the THT questions from https://github.com/hyperiondev-com/THT/blob/Mentor
- Please attempt every section.
- Please select one option for each of Section A and Section C.
- The languages for the options you pick or use for Section A and C should be different.
- For section D, please complete 2 of the 3 options.
- Please submit a link to a single publicly accessible GitHub repository that contains your solutions with a folder for each section.
- Please validate user input and handle all errors gracefully.
- No runtime errors or exceptions should be encountered while running your solutions.
- Please provide a README.md file in each section's folder describing setup and usage where applicable.

- If you deployed or published a solution, please include information about it in the corresponding README.md file, e.g. how to access the running application.
- Please include project files that would automate the installation of your dependencies.
- Please exclude any binaries or generated files, e.g. node_modules.
- Please include tests where possible.
- Please containerise your solutions where possible.
- We will assess your submission based on:
- The thoroughness of your submission
- Use of the data provided
- Creativity
- Research efforts
- Presentation
- Completion within the allocated time

Best wishes!

Section A: Code Review

This section simulates a typical interaction that you might have with a student. You will be given a question that a hypothetical student asks and the student's submitted code. You will be required to answer the question and review their code's correctness, efficiency, style and documentation.

Instructions

- Please present your review in a Markdown file.
- Please refer to the line numbers in your review.
- Please review the hypothetical student submissions by commenting on
    - Correctness
    - Efficiency
    - Style
    - Documentation
- Please comment on the positive aspects and improvements that are necessary while being encouraging.

Option 1: Python Task

Compulsory Task 1 Follow these steps:

- In a file called anagram.py, create:
- Given an array of strings strs, group the anagrams together.
- An Anagram is a word or phrase formed by rearranging the letters of a different word or phrase, typically using all the original letters exactly once.
    - You can return the answer in any order.
    - Strings consist of lowercase English letters.
- Example input
- Input: strs = ["eat","tea","tan","ate","nat","bat"]
- Output: [["bat"],["nat","tan"],["ate","eat","tea"]]

```
class Solution:

     def groupAnagrams(self, strs):

    result = {}

    for i in strs:

       x = "".join(sorted())

       if x in result:

          result[x].append(i)

       else:

          result[x] = [i]

    return list(result.values())

ob1 = Solution()

print(ob1.groupAnagrams(["eat", "tea", "tan", "ate", "nat", "bat"]))
```

Option 2: Java Task

Compulsory Task 1 Follow these steps:

- In a file called recursion.java, create:
    - a recursive function that reverses a string
    - a recursive function that, given a number n, prints out the first n Fibonacci numbers (Fibonacci numbers are a sequence

where each number is the sum of the previous two - 0 1 1 2 3 5 8...)

```
public class recursion {
   public static void main(String[] args) {
       // Saves the string that would be reversed
       String myStr = "emosewA si avaJ";
       //create Method and pass and input parameter string
       String reversed = reverse_string(myStr);
          System.out.println("The reversed string is: " + reversed + "\nFibonacci
Series of 10 numbers:0 1 1 2 3 5 8 13 21 34 ");


   }
   //Method take string parameter and check string is empty or not
   public static String reverse_string(String myStr)
   {
       if (myStr.isEmpty()){
        System.out.println("String in now Empty");
        return myStr;
       }
       //Calling Function Recursively
              System.out.println("String to be passed in Recursive Function:
"+myStr.substring(1));
       return reverseString(myStr.substring(1)) + myStr.charAt(0);}

   public static <T> void function(T maxNumber) {
       // Set it to the number of elements you want in the Fibonacci Series
       int maxNumber = 10;
       int previousNumber = 0;
       int nextNumber = 1;

       System.out.print("Fibonacci Series of "+maxNumber+" numbers:");
   for (int i = 1; i <= maxNumber; ++i){
       System.out.print(previousNumber+" ");
       // On each iteration, we are assigning second number
       // to the first number and assigning the sum of last two
       // numbers to the second number
       int sum = previousNumber + nextNumber;
       previousNumber = nextNumber;
       nextNumber = sum;
       }
   }
}
```

Option 3: Ruby Task

Compulsory Task 2 Follow these steps:

- Write an algorithm to determine whether an integer is a palindrome. An integer is a palindrome when it reads the same backwards and forwards.
    - The number 121 is a palindrome. From left to right, it reads 121. From right to left, it reads 121.
    - The number -121 is not a palindrome. From left to right, it reads -121. From right to left, it reads 121-. -The number 10 is not a palindrome. From left to right, it reads 10. From right to left, it reads 01.

```ruby
#set a variable reversed to 0 and number to a variable called num to pass into
while loop
def is_palindrome(x)
   if x < 0
   false
#the number to reverse does not equal 0 (completely extracted)
#continue extracting the ones value and adding it to the reversed number
#multiplied by 10 (to move it into the tens value)
# if it's not in the ones value, since the reversed originally is set to 0,
#  it would place that extracted number in the ones value. thus reversing the
integer.
   else
       reversd = 0
       num = x
       while num != x
           extracted = num%10
#set variable num to num divided by 10, thus getting rid of the ones value since
when you just use
#the division operator in ruby, it does not return the remainder.
           reversed = reversed*10 + extracted
           num=num/10
       end
#Once num value hits 0, the while loop extracted everything and the integer is
reversed.
#check the condition. If my reversed integer, does not equal my original integer,
the original integer is NOT a palindrome.
       if reversed != x
           false
       else
           true
       end
   end
```

Option 4: TypeScript Task

Compulsory Task 2 Follow these steps:

- In a file named caesar.ts, please create a function that implements the Caesar Cypher by taking 2 arguments, the string that is to be encoded and the shift value used for the encryption.
- For more information on what a Cypher Cipher is, please look at the following resource
- The function should return "THE QUICK BROWN DOG JUMPED OVER THE LAZY FOX." When the following are passed as arguments:
    - The string to be encoded: "GUR DHVPX OEBJA QBT WHZCRQ BIRE GUR YNML SBK."
    - The shift value: 39

```
//TypeScript Type: Alphabet
type Alphabet = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ';

// Function: Caesar Cipher
const caesar_cipher<T> = (string: T, shift: string) => {
 // Alphabet
 const alphabet: Alphabet = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ';

 // Encoded Text
 let encodedText: string = '';


 if (shift > 26) {

   shift = shift % 26; }

 let i: number = 0;
 while (i < string.length) {
   // Valid Alphabet Characters
   if (alphabet.indexOf(string[i]) !== -1) {
     // Find Alphabet Index
     const alphabetIndex: number = alphabet.indexOf((string[i]).toUpperCase());

     // Alphabet Index Is In Alphabet Range
     if (alphabet[alphabetIndex + shift]) {
       // Append To String
       encodedText += alphabet[alphabetIndex + shift];
     }
     // Alphabet Index Out Of Range (Adjust Alphabet By 26 Characters)
     else {
       // Append To String
       encodedText += alphabet[alphabetIndex + shift - 26];
     }
   }
```

```
    // Special Characters
    else {
      // Append To String
      encodedText += string[i];
    }

    // Increase I
    i++;
  }

  return encodedText;
};

//printing the output to terminal to test for correct output
//should print THE QUICK BROWN DOG JUMPED OVER THE LAZY FOX.
print(caesar_cipher('GUR DHVPX OEBJA QBT WHZCRQ BIRE GUR YNML SBK.', 39));
```

Section B: Projects

Instructions

- Please share a GitHub URL to a project you're most proud of.
- You may include the link in the repository you are submitting for the test.
- You may have completed it in the past or it may be freshly completed for this test.
- The project could be in any domain using any technology stack.

Section C: Code Challenge

Instructions

- We suggest that you implement a solution in either of the following languages - either Python, TypeScript, Ruby or Java.
- You're more than welcome to use any programming language and paradigm that you fancy as long as your solution is idiomatic.
- You are required to include a test suite for your solution.
- Please include all instructions and scripts necessary to build, test and run your solution on Linux, macOS and Windows operating systems.
- Please include a Markdown report that specifies and justifies the *worst-case space complexity* of your solution.

- Please attempt any of the alternatives available below:

Option 1: Say the Number

- https://edabit.com/challenge/4E9gTrRWErpTCA2FQ

Option 2: Road Navigation

- https://edabit.com/challenge/qQu4kxTEHapogmCgE

Option 3: Resistor Networks

- https://edabit.com/challenge/eWXL8Jz78hP5tW644

Option 4: ISBN

- https://edabit.com/challenge/C5mooK3wfdhoooeLw

Section D: Mentorship

Option 1: Student Progress

As a mentor, you are invested in every student's progress, as well as responsible for ensuring high task completion and graduation rates for our bootcamps.

In the following hypothetical situation, you have 20 part-time students on a 6-month bootcamp. Of this group, 5 students are 2 weeks behind on their expected progress in the bootcamp, 10 are at risk of falling behind (if they do not complete their next task in the next 2 days, they will be behind) and 5 are ahead of expected progress. Please lay out an intervention plan to get the 5 lagging students back on track whilst ensuring that the 10 at-risk students do not fall behind and the 5 students that are ahead are not negatively impacted.

Option 2: Java Support Task

In this task, we will simulate a typical interaction that you might have with a student during a mentor support call.

The student asks you the following question:

"I am trying to do Task 6 and the JOptionPane.ShowDialog() does not work. For some reason it does not store the input to the string variable it is assigned to, so my do-while loop ends up in an infinite loop. Can you please help me?"

Please describe the process that you would follow to help the student.

Option 3: Student Feedback

Handling student concerns is an important part of the mentorship role.

In the following scenario, you have provided feedback to a student in a code review for one of their submissions. After reading the feedback, the student responds in an irate manner claiming that you have provided feedback that does not provide any value, is generic and seems like you copy-pasted feedback just to complete the review. You did in fact provide non-generic, personalised and actionable feedback. On top of this, the student has also made a complaint on social media about the poor quality of your review. Please explain how you would handle this situation.