

# HackerRank: 30 Days of Code Challenge

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## **Abstract**

This is my (NPR's) set of notes from the HackerRank "30 Days of Code Challenge". The general idea here is to help myself learn/brush up on my Python skills. The .tex and .pdf of these notes can be found at: [https://github.com/d80b2t/Research\\_Notes](https://github.com/d80b2t/Research_Notes).

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## General Notes

All in Python3.

## 0 Day 0: Hello, World.

---

```
# Read a full line of input from stdin and save it to our
    dynamically typed variable, input_string.
inputString = input()
print (inputString)
```

---

## 1 Day 1: Data Types

---

```
i = 4
d = 4.0
s = 'HackerRank '

# Declare second integer, double, and String variables.
i2 = int(input())    # read int
d2 = float(input())  # read double
s2 = input()         # read string

# print summed and concatenated values
print(i + i2)
print(d + d2)
print(s + s2)
```

---

## 2 Day 2: Operators

---

```
mealCost = float(input())
tipPercent = int(input())
taxPercent = int(input())

tip = mealCost * (tipPercent/100.)
tax = mealCost * (taxPercent/100.)

totalCost = mealCost + tip + tax
total = round(totalCost)

print ('The total meal cost is', int(total), 'dollars.')
```

---

### 3 Day 3: Intro to Conditional Statements

---

```
import sys

N = int(input().strip())
condition = 'Not Weird'

if N % 2 != 0:
    condition = 'Weird'
elif N % 2 == 0 and (N >= 6 and N <= 20):
    condition = 'Weird'
else:
    condition = 'Not Weird'

print(condition)
```

---



## 4 Day 4: Class vs. Instance

---

'''

Objective:

In this challenge, we are going to learn about the difference between a class and an instance; because this is an Object Oriented concept, it is only enabled in certain languages. Check out the Tutorial tab for learning materials and an instructional video!

Task:

Write a Person class with an instance variable, age, and a constructor that takes an integer, initialAge, as a parameter. The constructor must assign initialAge to age after confirming the argument passed as initialAge is not negative; if a negative argument is passed as initialAge, the constructor should set age to 0 and print Age is not valid, setting age to 0. In addition, you must write the following instance methods:

yearPasses() should increase the age instance variable by 1.

amIOld() should perform the following conditional actions:

If age < 13, print You are young.

If >= 13 and age < 18, print You are a teenager.

Otherwise, print You are old.

To help you learn by example and complete this challenge, much of the code is provided for you, but you'll be writing everything in the future. The code that creates each instance of your Person class is in the main method. Dont worry if you dont understand it all quite yet!

'''

```
class Person:
```

```
    def __init__(self, initialAge):
```

```
        # Add some more code to run some checks on initialAge
```

```
        self.age = 0
```

```
        if initialAge < 0:
```

```
            print ("Age is not valid, setting age to 0.")
```

```
        else:
```

```
            self.age = initialAge
```

```
    def amIOld(self):
```

```
        # Do some computations in here and print out the correct  
        # statement to the console
```

```
        if age < 13:
```

```
            print("You are young.")
```

```
        elif 13 <= age < 18:
```

```

        print("You are a teenager.")
    elif age >= 18:
        print("You are old.")

    def yearPasses(self):
        # Increment the age of the person in here
        global age #NPR: don't quite understand what global does
                   here...
        age += 1

t = int(input())
for i in range(0, t):
    age = int(input())
    p = Person(age)
    p.amIOld()
    for j in range(0, 3):
        p.yearPasses()
    p.amIOld()
    print("")

```

---

## 5 Day 5: Loops

---

```
'''
```

Objective:

In this challenge, we are going to use loops to help us do some simple math. Check out the Tutorial tab to learn more.

Task

Given an integer, `n`, print its first multiples. Each multiple (where `i` is from 1 to 10) should be printed on a new line in the form: `N x i = result`.

```
'''
```

```
import sys
```

```
N = int(input().strip())
```

```
for ii in range(1, 11):  
    print (N, 'x', ii, '=', N*ii)
```

---

## 6 Day 6: Let's Review

---

Task:

Given a string, S, of length N that is indexed from 0 to N-1, print its even-indexed and odd-indexed characters as space-separated strings on a single line (see the Sample below for more detail).

Note: 0 is considered to be an even index.

Sample Input:

```
2
Hacker
Rank
```

Sample Output:

```
Hce akr
Rn ak
'''
```

```
for i in range(int(eval(input()))):
    s=eval(input())
    print((*["".join(s[::2]),"".join(s[1::2])]))
```

---

## 7 Day 7: Arrays

---

```
'''
Task: Given an array, A, of N integers, print A's elements in
      reverse order as a single line of space-separated numbers.

http://docs.scipy.org/doc/numpy/reference/routines.array-manipulation.html
http://www.scipy-lectures.org/intro/numpy/numpy.html
'''

import sys

n = int(input().strip())
arr = [int(arr_temp) for arr_temp in input().strip().split(' ')]

# print(arr[::-1])
print(" ".join(map(str, arr[::-1])))
```

---

## 8 Day 8: Dictionaries and Maps

---

```
'''
```

Objective:: Today, we are learning about Key-Value pair mappings using a Map or Dictionary data structure. Check out the Tutorial tab for learning materials and an instructional video!

Task:: Given N names and phone numbers, assemble a phone book that maps friends names to their respective phone numbers. You will then be given an unknown number of names to query your phone book for; for each name queried, print the associated entry from your phone book (in the form ) or if there is no entry for .

Note: Your phone book should be a Dictionary/Map/HashMap data structure.

Sample Input:

```
3
sam 99912222
tom 11122222
harry 12299933
sam
edward
harry
'''
```

```
import sys

# Read input and assemble phoneBook
n = int(input())
phoneBook = {}
for i in range(n):
    contact = input().split(' ')
    phoneBook[contact[0]] = contact[1]

# Process Queries
lines = sys.stdin.readlines()
for i in lines:
    name = i.strip()
    if name in phoneBook:
        print(name + '=' + str( phoneBook[name] ))
    else:
        print('Not found')
```

---

## 9 Day 9: Recursion

---

'''

Objective:: Today, we are learning and practicing an algorithmic concept called Recursion. Check out the Tutorial tab for learning materials and an instructional video!

Task:: Write a factorial function that takes a positive integer, N, as a parameter and prints the result of N!

Note: If you fail to use recursion or fail to name your recursive function factorial or Factorial, you will get a score of 0.

Input Format: A single integer, N (the argument to pass to factorial).

'''

```
def factorial(n):
    if n == 0 or n == 1:
        return 1
    else:
        return n * factorial(n-1)

print((factorial(int(eval(input())))))
```

---

## 10 Day 10: Binary Numbers

---

```
'''
Task:: Given a base-10 integer, n, convert it to binary (base-2).
       Then find and print the base-1- integer denoting the maximum
       number of consecutive 1's in n's binary representation.

'''

bin(11111113)
# '0b101010011000101011001001'

bin(11111113)[2:]
# '101010011000101011001001'

bin(11111113)[2:].split()
# ['101010011000101011001001']

bin(11111113)[2:].split('0')
# ['1', '1', '1', '', '11', '', '', '1', '1', '11', '', '1', '',
  '1']

max(bin(11111113)[2:].split('0'))
# '11'

#len(max(bin(11111113)[2:].split('0')))

print(len(max(bin(int(input().strip()))[2:].split('0'))))
```

---



## 11 Day 11: 2D Arrays

---

```
'''
```

Context: Given a 6x6 2D Array, A:

```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 0 0 0 0 0
0 0 0 0 0 0
0 0 0 0 0 0
```

We define an hourglass in A to be a subset of values with indices falling in this pattern in A's graphical representation:

```
a b c
  d
e f g
```

There are 16 hourglasses in A, and an hourglass sum is the sum of an hourglass's values.

Task:: Calculate the hourglass sum for every hourglass in A, then print the maximum hourglass sum.

Sample Input::

```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 0 2 4 4 0
0 0 0 2 0 0
0 0 1 2 4 0
```

Sample Output::

```
19
'''
```

```
import sys
```

```
arr = []
for arr_i in range(6):
    arr_t = [int(arr_temp) for arr_temp in input().strip().split(' ')]
    arr.append(arr_t)
```

```
res = []
for x in range(0, 4):
    for y in range(0, 4):
        print(x,y)
```

```
print('arr[x] [y:y+3]', arr[x] [y:y+3])
print('arr[x+1] [y+1]', arr[x+1] [y+1])
print('arr[x+2] [y:y+3]', arr[x+2] [y:y+3])
s = sum(arr[x] [y:y+3]) + arr[x+1] [y+1] + sum(arr[x+2] [y:y+3])
res.append(s)

print(max(res))
```

---

## 12 Day 12: Inheritance

---

'''

Objective:: Today, we are delving into Inheritance. Check out the Tutorial tab for learning materials and an instructional video!

Task:: You are given two classes, Person and Student, where Person is the base class and Student is the derived class. Completed code for Person and a declaration for Student are provided for you in the editor. Observe that Student inherits all the properties of Person.

Complete the Student class by writing the following:

A Student class constructor, which has parameters:

A string, firstName.

A string, lastName.

An integer, id.

An integer array (or vector) of test scores, scores.

A char calculate() method that calculates a Student object's average and returns the grade character representative of their calculated average.

Sample Input::

Heraldo Memelli 8135627

2

100 80

Sample Output::

Name: Memelli, Heraldo

ID: 8135627

Grade: O

'''

```
class Person:
```

```
    def __init__(self, firstName, lastName, idNumber):
```

```
        self.firstName = firstName
```

```
    self.lastName = lastName
```

```
    self.idNumber = idNumber
```

```
    def printPerson(self):
```

```
        print("Name:", self.lastName + ",", self.firstName)
```

```
        print("ID:", self.idNumber)
```

```
class Student(Person):
```

```
    def __init__(self, firstName, lastName, idNumber, scores):
```

```
        Person.__init__(self, firstName, lastName, idNumber)
```

```

        self.testScores = scores

    def calculate(self):
        average = 0
        for i in self.testScores:
            average += i

        average = average / len(self.testScores)

        if(average >= 90):
            return 'O' # Outstanding
        elif(average >= 80):
            return 'E' # Exceeds Expectations
        elif(average >= 70):
            return 'A' # Acceptable
        elif(average >= 55):
            return 'P' # Poor
        elif(average >= 40):
            return 'D' # Dreadful
        else:
            return 'T' # Troll

line = input().split()
firstName = line[0]
lastName = line[1]
idNum = line[2]
numScores = int(input()) # not needed for Python
scores = list( map(int, input().split()) )
s = Student(firstName, lastName, idNum, scores)
s.printPerson()
print("Grade:", s.calculate())

```

---

## 13 Day 13: Abstract Classes

---

'''

Objective:: Today, we are taking what we learned yesterday about Inheritance and extending it to Abstract Classes. Because this is a very specific Object-Oriented concept, submissions are limited to the few languages that use this construct. Check out the Tutorial tab for learning materials and an instructional video!

Task:: Given a Book class and a Solution class, write a MyBook class that does the following:

-- Inherits from Book

-- Has a parameterized constructor taking these parameters:

-- string title

-- string author

-- int price

Implements the Book class abstract display() method so it prints these 3 lines:

1. Title, a space, and then the current instances title.
2. Author, a space, and then the current instances author.
3. Price, a space, and then the current instances price.

Note: Because these classes are being written in the same file, you must not use an access modifier (e.g.: ) when declaring MyBook or your code will not execute.

Input Format:: You are not responsible for reading any input from stdin. The Solution class creates a Book object and calls the MyBook class constructor (passing it the necessary arguments). It then calls the display method on the Book object.

Output Format:: The void display() method should print and label the respective, title, author and price of the MyBook objects instance (with each value on its own line) like so:

Title: \$title

Author: \$author

Price: \$price

Note: The \$ is prepended to variable names to indicate they are placeholders for variables.

Sample Input::

The following input from stdin is handled by the locked stub code in your editor:

The Alchemist

Paulo Coelho

```

248
'''

from abc import ABCMeta, abstractmethod

class Book(object, metaclass=ABCMeta):
    def __init__(self, title, author):
        self.title=title
        self.author=author
    @abstractmethod
    def display(): pass

class MyBook(Book):
    price = 0
    def __init__(self, title, author, price):
        super(Book, self).__init__()
        self.price = price

    def display(self):
        print("Title: " + title)
        print("Author: " + author)
        print("Price: " + str(price))

title =input()
author =input()
price =int(input())
new_novel=MyBook(title,author,price)
new_novel.display()

```

---

## 14 Day 14: Scope

---

"""

Objective:: Today we're discussing scope. Check out the Tutorial tab for learning materials and an instructional video!

The absolute difference between two integers, a and b, is written as  $|a-b|$ . The maximum absolute difference between two integers in a set of positive integers, elements, is the largest absolute difference between any two integers in elements.

The Difference class is started for you in the editor. It has a private integer array (elements) for storing N non-negative integers, and a public integer (maximumDifference) for storing the maximum absolute difference.

Task:: Complete the Difference class by writing the following:

- A class constructor that takes an array of integers as a parameter and saves it to the instance variable.
- A computeDifference method that finds the maximum absolute difference between any numbers in and stores it in the instance variable.

Input Format:: You are not responsible for reading any input from stdin. The locked Solution class in your editor reads in 2 lines of input; the first line contains N, and the second line describes the elements array.

Sample Input::

```
3
1 2 5
```

Sample Output::

```
4
"""
```

```
class Difference:
    def __init__(self, a):
        self.__elements = a
# Add your code here
    def computeDifference(self):
        self.maximumDifference = abs(max(self.__elements) -
                                     min(self.__elements))
# End of Difference class

##
## NOTE TO NPR: The indentation really had to be correct here!!
## aka, you kinda really need to understand these Classes a bit
## better!!
```

```

##

"""
Your constructor must save the argument passed as its integer array
parameter to the integer array instance variable ().

The computeDifference method must then access the the integer array
instance variable () and find its maximum and minimum elements.
Once these are found, the method must save their absolute
difference to the instance variable.

Note: The use of Math.abs is not really necessary. Because the
problem constraints stipulate that we are only dealing with
positive numbers, will always be positive.
"""

_ = input()
a = [int(e) for e in input().split(' ')]

d = Difference(a)
d.computeDifference()

print(d.maximumDifference)

```

---



## 15 Day 15: Linked List

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## 16 Day 16: Exceptions - String to Integer

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## 17 Day 17: More Exceptions

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## 18 Day 18: Queues and Stacks

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## 19 Day 19: Interfaces

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## 20 Day 20: Sorting

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## 21 Day 21: Generics

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## 22 Day 22: Binary Search Trees

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## 23 Day 23: BST Level-Order Traversal

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## 24 Day 24: More Linked Lists

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## 25 Day 25: Running Time and Complexity

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## 26 Day 26: Nested Logic

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## 27 Day 27: Testing

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## 28 Day 28: RegEx, Patterns, and Intro to Databases

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## 29 Day 29: Bitwise AND

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