上 海 交 通 大 学 试 卷（ A 卷）

（ 2020 至 2021学年 第1学期 ）

班级号\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 学号\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 姓名

课程名称 CS124计算导论 成绩

**Python 3** is the only programming language allowed for this course. **100 points in all.**

**(1). Please choose the correct answer: Only one is correct for each question. (2 points each, 40 points.)**

1. What is the output of the following code? ( )

print([] is [], []==[])

A. True True B. True False C. False True D. False False

2. Which code does not have error(s) when running? ( )

|  |  |
| --- | --- |
| A. | B. |
| S = “{0} {0}”.format([1]) | S = “123” |
|  | S[0] = “0” |
|  |  |
| C. | D. |
| from math import tan | f1 = open(“1.txt”, “w”) |
| print(math.tan(2)) | f1.write(123) |
|  | f1.close() |

3. Given the code print(**f**(lambda x,y:x+y,[1,2,3,4,5])), the output is 15, what is ‘**f**’? ( )

1. map B. add C. reduce D. filter

4. What is the output of the following code? ( )

print({x:y for x in range(2) for y in range(2)})

A. {0: 1, 1: 1} B. {0:1, 1:0} C. {0:0, 0:1, 1:0, 1:1} D. {1:0, 1:1}

5. What is the output of the following code? ( )

A = [[0,1,2,3]] \* 3

A[0][0] = 4

del A[-1]

print(A, end="")

1. [] B.[[4, 1, 2, 3], [0, 1, 2, 3]] C. [[4, 1, 2, 3], [4, 1, 2, 3]] D. [[0, 1, 2, 3], [0, 1, 2, 3]]

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 题号 | 1 | 2 | 3 | 4 | 5 |  |  |  |  |  |
| 得分 |  |  |  |  |  |  |  |  |  |  |
| 批阅人(流水阅  卷教师签名处) |  |  |  |  |  |  |  |  |  |  |

**我承诺，我将严格遵守考试纪律。**

**承诺人：**

6. What is the returned value of the function showed below when the function parameter is a python list [1, 2, 3] ? ( )

def f(s):

if s == []:

return [[]]

return f(s[1:]) + [x + [s[0]] for x in f(s[1:])]

f([1, 2, 3]) = ?

A. [[], [1], [2], [1, 2], [3], [1, 3], [2, 3], [1, 2, 3]]

B. [[], [3], [2], [3, 2], [1], [3, 1], [2, 1], [3, 2, 1]]

C. [[3, 2, 1], [3, 2], [3, 1], [3], [2, 1], [2], [1], []]

D. [[1, 2, 3], [2, 3], [1, 3], [3], [1, 2], [2], [1], []]

7. Given the definition of function **f** and the lambda expressions **add, minus, multi** and **power,** what is the returned value of calc([1,2,3,4,5], add, power, minus, multi) ? ( )

add = lambda x, y: x + y

minus = lambda x, y: x - y

multi = lambda x, y: x \* y

power = lambda x, y: x \*\* y

def calc(operands, \*operations):

for op in operations:

operands.append(op(operands.pop(), operands.pop()))

return operands[-1]

A. 115 B. 162 C. 290 D. 727

8. What is the output of the python code below? ( )

i = 0

L = [1, 2, 3]

i, L[i] = L[i], i

print(i, L, end="")

A. 1 [0, 2, 3] B. 1 [1, 0, 3] C. 1 [1, 2, 3] D. 1 [1, 1, 3]

9. The output of the following program is: ( )

def f():

s = 100

s += 200

print(s)

del s

print(s)

s = 0

f()

A. 0 B. 100 C. 200 D. Error

10. The following part is the definition of

class T:

def \_\_init\_\_(self, a, b):

self.a = a

self.b = b

What will the following codes output after their execution? ( )

a = T(1, 1)

b = a

b.a, a.b = 2, 3

print(a.a, b.b)

A. 1 1 B. 1 3 C. 2 1 D. 2 3

11. What is the output of the python code below? ( )

alist = [1, 2, "def" , 3, "abc"]

b = (x for x in alist)

next(b)

aset, atuple = set(b), tuple(b)

print(aset, atuple)

A. {2, 3, 'def', 'abc'}, () B. {1, 2, 3, 'def', 'abc'}, ()

C. {2, 3, 'def', 'abc'}, (1, 2, "def", 3, "abc") D. {1, 2, 3, 'def', 'abc'}, (1, 2, "def", 3, "abc")

12. Given the following codes, which output is correct? ( )

x = ['ab', 'cd']

for i in x:

x.append(i.upper())

print(x)

A. ['ab', 'cd'] B. ['AB', 'CD']

C. ['ab', 'cd', 'AB', 'CD'] D. No output

13. What is the result of 24 / 2 \*\* 4 in Python3? ( )

A. 2 B. 1 C. 1.5 D. 20736

14. Which of the following is valid? ( )

A. B.

a = ("a", "b", "c") b = ["a", "b", "c"]

a[0] = "2020" b[-4] = "2018"

C. D.

c = ["a", "b", "c"] d = "abc"

c[-4:] = "d" d[0] = “d”

15. s = “the sky is blue”，the result of the expression print(s[-4:], s[:-4]) is: ( )

A. blue the sky is B. blue is sky the

C. sky is blue the D. the sky is blue

16. Choose the correct output for the following program: ( )

sentence = "hello 54749110 this is john"

counter1, counter2, counter3 = 0, 0, 0

for character in sentence:

if character.isdigit():

counter1 += 1

if character.isalpha():

counter2 += 1

else:

counter3 += 1

print(counter1, counter2, counter3)

A. 8, 15, 12 B. 8, 15, 4 C. 8, 15, 5 D. 8, 16, 4

17. Choose the correct output for the following program: ( )

def mypow():

plist = []

for i in range(3):

plist.append(lambda x: x\*\*i)

return plist

for i in range(3):

print(mypow()[i](2), end=" ")

A. 4 4 4 B. 1 2 4 C. 2 2 2 D. 1 1 1

18. Choose the correct output for the following program: ( )

from functools import reduce

alist = (4, 3, 7, -1)

print(reduce(lambda a, b: (a,b)[a<=b], alist))

A. 4 B. 3 C. 7 D. -1

19. Which value can be the key of dict? ( )

① [1,2,3,4] ② (1,2,4) ③ {2:4} ④ “4”

A. ①②③④ B. ①②④ C. ②④ D. ④

20. There is a string S = “12345”, which code **CANNOT** generate [“12345”]? ( )

① list(S) ② S.split() ③ [S.join(“”)]

A. ①② B. ①③ C. ② D. ③

Problem 2 (15pts) **Happy Number**

Write an algorithm to determine if a number is "happy".

A happy number is a number defined by the following process: Starting with any positive integer, replace the number by the sum of the squares of its digits, and repeat the process until the number equals 1 (where it will stay), or it loops endlessly in a cycle which does not include 1. Those numbers for which this process ends in 1 are happy numbers.

**Example:**

**Input:** 19

**Output:** True

**Explanation:**

**def is\_happy\_number(n):** # return True or False

Problem 3 (15pts) **Valid Anagram**

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. For example, "evil" = "vile".

Given two strings *s* and *t* , write a function to determine if *t* is an anagram of *s*.

**Example 1:**

**Input:** *s* = "anagram", *t* = "nagaram"

**Output:** true

**Example 2:**

**Input:** *s* = "rat", *t* = "car"

**Output:** false

**Note:** You may assume the string contains only lowercase alphabets.

**def is\_anagram(s, t): # return True or False**

Problem 4 (15pts) **Intersection of Two Arrays II**

Given two arrays, write a function to compute their intersection.

**Example 1:**

**Input:** nums1 = [1,2,2,1], nums2 = [2,2]

**Output:** [2,2]

**Example 2:**

**Input:** nums1 = [4,9,5], nums2 = [9,4,9,8,4]

**Output:** [4,9]

**Note:**

 Each element in the result should appear as many times as it shows in both arrays.

 The result can be in any order.

**def intersections(list1, list2):** #list1 and list2 are of the type list, return list

Problem 5 (15pts) **Hamming distance**

The Hamming distance between two integers is the number of positions at which the corresponding bits are different (即对应的二进制表示，有多少位不同)

Given two integers, calculate the Hamming distance.

Input: x=1, y = 4

Output: 2

Because x=1=001, y =4= 100, so the number of different bits of x and y is 2.

**def hamming\_distance(x, y):** # return distance