計算機程式 110 學年度第 1 學期小考 3 試題 A

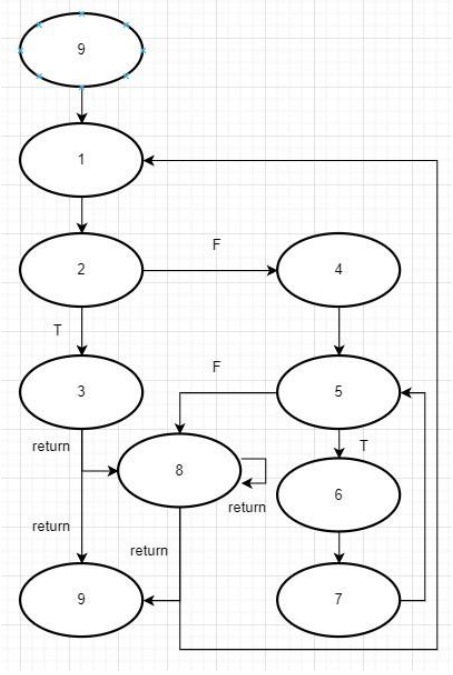
系級：_____學號：_____ 姓名：_____

1. (1) Line 1 123 (2) Line 2 45123 (3) Line 3 43

What are the first 3 lines output of the following code?

```
01 def test01(num):
02     if num == 1 or num%3==0:
03         return num
04     else:
05         for i in range(1,num+1):
06             print(i, end='')
07             if (i%3==0): print('')
08         return test01(num - 1)
09 print(test01(5))
```

(4) Draw the program flow chart.

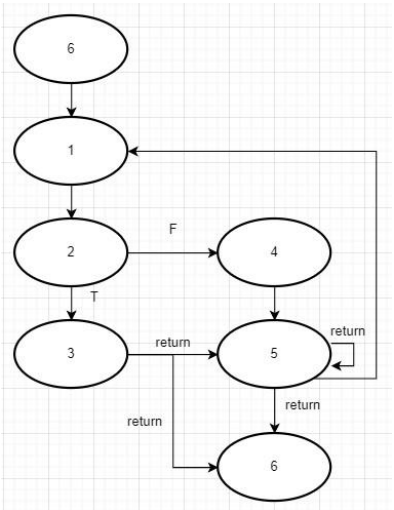


2. (1) ==0 (2) n

Apply recursive to compute f.

```
01 def f(m, n):
02     if n _____:                    #1
03         return  m
04     else:
05         return f(_____, n%m)   #2
06 print(f(18, 24))
```

(3) Draw the program flow chart.



3. (1) 2 The output is 11, 15, 9, 11.

```
01 def f04 (n):
02     if n >= 6:
03         return n
04     else:
05         return ( ___ + f04(2*n+1))   #1-Integer
06 print(f04(1), f04(2), f04(3), f04(4))
```

(2) The execution sequence

6,1,2,4,5,1,2,4,5,1,2,3,5,5,6,1,2,4,5,1,2,4,5,1,2,3,5,5,6,1,2,4,5,1,2,3,5,6,1,2,4,5,1,2,3,5,6

4. (1) output 12 (2) call f04 5 times

```
01 def f04(a):
02     if (a > 1): return f04(a - 3) + 3
03     return a
04 print(f04(12))
```

5. (1) output is 60 (2) call f05 5 times

```
01 def f05(n, m):
02     if (n < 10):
03         if (m < 10):
04             return n + m
05         else: return f05(n, m-1) + m
06     else: return f05(n-2, m) + n
07 print(f05(10, 12))
```

6. Output (1) **Line 2**: B A 2 (2) **Line 3**: C B 1

(3) **Line 4**: B A 3

```
01 def move_tower(sou, des, tmp, n, m):
02     if (m==n): print(des, sou, n)
03     else:
04         move_tower(sou,des,tmp,n,m-1)
05         print(des, sou, m)
06         move_tower(des,tmp,sou,n,m-1)
07 move_tower('A','B','C',1,3)
```

7. Output (1)Line 1: [2] (2) Line 2: [1, 1]

(3) Line 3: [2, 1, 1, 2, 1, 1] (4) Line 4: [2, 2]

```
01 def hand1(n):
02     h=[]
03     if n==1 or n ==2:
04         return [n]
05     else:
06         for i in range(n-1):
07             h += [n-1] + hand2(n-1)
08         return h
09 def hand2(n):
10   if (n<2): return [1]
11   else: return [n-1] + hand1(n-1)
12 for k in range(2, 4):
13     print(hand1(k))
       print(hand2(k))
```

8. Complete the binary search. (1) _mid_ (2) _ left==right _

(3) The output of f(7) ___-1____

(4) f(7) The execution sequence

12,10,11,1,2,3,5,7,8,1,2,3,5,7,9,1,2,3,5,6,9,8,11,12

```
01 def search(data, left, right, key):
02     mid = (left+right)//2
03     if data[_____]==key:          #1
04         return mid
05     if _____:                     #2
06         return -1
```

```
07        if data[mid]>key:
08              return search(data, left, mid-1, key)
09        else: return search(data, mid+1, right, key)
10  def f(x):
11        print(search([3, 17, 19, 21, 29], 0, 5, x))
12  f(7)
```

9. The output is "WXYZ,XWYZ,YWXZ,ZWXY,".

(1) len(s) (2) i (3) i+1

```
01  def M(s):
02        for i in range(_____):                    #1
03              print(s[i]+s[:___]+s[___:], end=',') #2, #3
04  M('WXYZ')
```

10. The output is "['012', '021', '102', '120', '201', '210']".

(1) [perm] (2) [] (3) perm[s+1:] (4) i

```
01  def P(perm):
02        if len(perm)<=1:return _________          #1
03        r = _________                             #2
04        for s in range(len(perm)):
05              for i in P(perm[0:s]+_________):     #3
06                    r = r + [perm[s] + _____]     #4
07        return r
08  print(P('012'))
```

11. The output is "[3, 5, 7, 9, 11, 13, 15]-[True, True, True, False, True, True, False]" (1) True (2) False (3) N, i-1 (4) %2 (5) x

```
01  def f(N, i):
02        if i<=1: return _______                   #1
03        if N%i==0: return _______                 #2
04        else: return f(_______)                   #3
05
06  def prime(N):
07        x = [i for i in range(3, N) if i____!=0]  #4
08        y = [f(i, i//2) for i in ____]            #5
09        print(x, end='-')
10        print(y)
11
12  prime(16)
```

12. 請寫出 Insertion Sort 的演算步驟。Please write down the algorithm steps of Insertion Sort. (30 characters or more will be scored)

- 一開始，只有第一個元素在 sorted part，其他在 unsorted part
- 設定排序的值為 key
- 若 key 值左邊元素大於 key 則右移
- 把 key 設定為右移的最左邊

13. 請寫出 Quick Sort 的演算步驟。Please write down the algorithm steps of Quick Sort. (30 characters or more will be scored)

- 選取第 x 個元素為基準
- 從最右邊往左找比基準 x 還小的元素
- 從最左邊往又找比基準 x 還大的元素
- 兩個元素交換
- 重複

14. 目前翻轉教室同學報告的主題中，哪一個印象最深刻，請簡要敘述內容。(30 字含以上才計分) Among the topics of the current flipped classroom report, which one is the most impressive, please briefly describe the content. (30 characters or more will be scored)

15. 請針對計算機程式設計課程教學，提出目前學習上較有疑惑的章節(ex:函式、迴圈…etc)，寫出問題以及打算如何補強。(30 字含以上才計分) For the computer programming course, please point the more confusing section (ex: functions, loops...etc) in the current study. Write down the problem and how to improve it. (30 characters or more will be scored)

16. Complete the code. (1) v (2) 0 (2) bag

```
output
x, 4,y, 3,y, 2,y, 1,y, 0,
w, [5] [4, 3, 2, 1]
x, 2,z, 1,y, 0,
w, [2, 3] [4, 1]
x, 1,z, 0,
w, [1, 4] []
```

```
01  def fBag(data, id, v, bag):
02        if id>=len(data) or v<data[id]:
03              return False
04        elif data[id]==v:
05              bag.append(data[id])
06              print('x,', id, end=',')
07              return True
08        elif fBag(data, id+1, _____, bag)==True:   #1
09              print('y,', id,end=',')
10              return True
11        elif fBag(data, id+1, v-data[id], bag)==True:
12              bag.append(data[id])
13              print('z,', id,end=',')
14              return True
15        else: return False
16
17  data = [4, 3, 2, 1, 5]
18  N = 3
19  value = sum(data)/N
20  for i in range(N):
21        bag=[]
22        fBag(data, _____, value, bag)              #2
23        for e in _____:                            #3
24              data.remove(e)
25        print('\nw,',bag, data)
```