

商管程式設計（107-2）

作業七

作業設計：盧信銘
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截止時間：2019 年 4 月 29 日 21 點

測資助教：薛光佑

作業繳交請至 PDOGS (<http://pdogs.ntu.im/judge/>)。為各題上 Python 3.5 原始碼 (以複製貼上原始碼的方式上傳)。作業自己做。嚴禁抄襲。不接受紙本繳交，不接受遲交。請以英文或中文作答。

除了課本的內容外，Python 線上文件也很有用: <https://docs.python.org/3/>。好的程式設計師會把線上文件摸熟。

本次作業可以在各題使用的 library: math, sys, string。另外，第一題可使用 datetime，第二題可以使用 csv。除上述可用之 library，禁用其他 library。違反禁用規定者，當題不予計分。如果你的結果正確，但沒有依照題目規定的方式實作，亦不予計分。

第一題

(40 points) 人類的社會有各種特殊節日。有些節日有固定日期，如新年一定是一月一日。然而，有些節日必須要以某種規則算出。比如說母親節是每年五月的第二個星期日。這種節日的日期就不固定。本題將練習計算各種節日在某一年的日期。寫一個程式，讓使用者輸入一個 1900 至 3000 的年份，程式將輸出下列節日的日期：

- 母親節 (MOTHERS_DAY): 每年五月的第二個星期日。
- 祖父母節 (GRANDPARENTS_DAY): 每年 8 月第四個星期日。
- 泰雅族感恩節 (ATAYALS_DAY): 每年 8 月最後一個星期五。
- 撒奇萊雅族火神祭 (SAKIZAYAS_DAY): 每年 10 月第一個星期五。
- 馬丁路德紀念日 (MLKINGS_DAY): 每年一月的第三個星期一。

輸出時請依照上列節日的順序，先輸出節日的英文代號，即括號內之字串，接著輸出一個空白，然後日期。日期須是 YYYY-MM-DD 的格式。如 1975 年 9 月 12 日的輸出為 1975-09-12。

Sample input:

2017

Sample output:

MOTHERS_DAY 2017-05-14 GRANDPARENTS_DAY 2017-08-27 ATAYALS_DAY 2017-08-25 SAKIZAYAS_DAY 2017-10-06 MLKINGS_DAY 2017-01-16

Sample Input:

2016

Sample Output:

MOTHERS_DAY 2016-05-08 GRANDPARENTS_DAY 2016-08-28 ATAYALS_DAY 2016-08-26 SAKIZAYAS_DAY 2016-10-07 MLKINGS_DAY 2016-01-18

Sample Input:

2015

Sample Output:

MOTHERS_DAY 2015-05-10 GRANDPARENTS_DAY 2015-08-23 ATAYALS_DAY 2015-08-28 SAKIZAYAS_DAY 2015-10-02 MLKINGS_DAY 2015-01-19

評分原則：依據程式運算的正確性給分。一筆測試資料佔 2 分。

第二題

(30 points) 在正式開始資料分析工作前，常常會需要對原始資料作適當的整理。本題將練習在資料前處理中會遇到的問題。我們假設資料已經存在 CSV 格式的檔案中，第一個欄位為主要 ID，第二個欄位為這個 ID 所對應的數值。資料的第一個列為欄位名稱。我們在這裡提供一個範例程式片段，說明如何讀取 CSV 檔案:

<pre>import csv fn1 = "hw7_ds1a.csv"</pre>
--

```
fh1 = open(fn1, 'r', newline = '', encoding = 'utf-8')
csv1 = csv.DictReader(fh1)
cname1 = csv1.fieldnames
print("Column names are: ", cname1)
print("Now print the value of the second column:")
for aline in csv1:
    print(aline[cname1[1]].strip())
```

在 `import csv` 之後，我們使用 `open()` 來打開檔案，傳入的參數指定檔名，設為讀取模式，`newline` 參數指定 `open()` 不對換行字元做額外處理（這是 `csv` library 規定的方式），`encoding` 指定編碼模式。接下來的 `csv.DictReader(fh1)` 則會讓後續的資料讀取可以使用 `Dictionary` 來抓取某個 `column` 的值。`csv1.fieldnames` 中為原始檔案第一列中的欄位名稱。之後我們可以使用 `for` 迴圈依序讀取資料，每一列 (a line) 皆為一個 `Dictionary` 結構。範例中我們要印出第二個 `column`，因此用 `cname1[1]` 取得這個 `column` 的名稱，並且用這個名稱取得對應的值，然後印出。

這個程式的輸出為：

```
Column names are: ['id', ' value']
Now print the value of the second column:
120
160
145
88
26
25
85
```

原始的 `hw7_ds1a.csv` 檔案內容為：

```
id,value
name1,120
name2,160
name3,145
name4,88
name5,26
name2,25
name9,85
```

了解如何讀取 `CSV` 檔案之後，接下來要我們練習的工作，是去除重複值。假設每一個 `ID` 應改只會對應到一個值，如果有一個 `ID` 有多個值的狀況，則取這些值中最大的那個，並去除其他多餘的值。舉例而言，上面列出的 `hw7_ds1a.csv` 內容中，`name2` 有兩個值，分別是 160 與 25，因此 `name2` 只留下 160。其他的 `ID` 都只有一個值，因此不做額外的處理。

請寫一個程式，由 `input()` 讀入 CSV 檔案路徑，然後對這個 CSV 檔案內容去除重複值。我們假設第一個欄位為 ID，第二個欄位為數值資料(浮點數)。輸出時須先對 ID 依照字串內部編碼排序，然後依序輸出每個 ID 與其對應的數值。ID 與數值之間應間隔一個空白。數字應有一位小數。

Sample input:

```
hw7_ds1a.csv
```

Sample output:

```
name1 120.0
name2 160.0
name3 145.0
name4 88.0
name5 26.0
name9 85.0
```

hw7_ds1b.csv 內容:

```
id,value2
zz02, 560
name2,60
name3,45
name4,8
name5,26
name12,125
name19,185
zz02,-124
```

Sample input:

```
hw7_ds1b.csv
```

Sample output:

```
name12 125.0
name19 185.0
name2 60.0
name3 45.0
name4 8.0
name5 26.0
zz02 560.0
```

評分原則：依據程式運算的正確性給分。一筆測試資料佔 2 分。

第三題

(42 points) 在檔案中搜尋字串是一個重要的功能。本題將練習這個功能。寫一個程式，由使用者讀入檔案名稱與要搜尋的字串，然後進行搜尋，並輸出結果。

其中欲搜尋的檔案名稱與欲搜尋字串各一行依序讀入。如果搜尋的是英文，則忽略大小寫。不論是何種語言，"Tab" 字元應視為一個空白，如果有多個連續空白，應只留一個空白，忽略其他多餘空白。舉例而言，搜尋 "01 23" 與搜尋 "01 23" 的結果應該一樣。第一個字串中間有兩個空白，與第二個字串中間只有一個空白是代表同樣的搜尋。但 "0123" 則是不一樣的搜尋條件，因為字串中沒有空白。另外搜尋條件前後多餘的空白應直接忽略，也就是說搜尋 " 01 23 " 應視為搜尋 "01 23"。另外，搜尋匹配時也應忽略一個以上的空白。舉例而言，如果搜尋條件為 "1 23"，則 "01 23456" 應該被搜尋到，而 "0123456" 則不應該被搜尋到。

輸出時應依序印出符合條件的前一行，符合的那行，以及下一行。下面是輸出範例格式：

```
----Match 25
    @678: 《唐六典》
    @679: 《貞觀政要》
    @680: 《大唐創業起居注》
```

每個符合搜尋條件行輸出時，應以 "----Match" 開頭，接續這是第幾個符合條件的行（由 1 開始）。後面列印三行內容時，應先空四格，然後以 @ 開頭，接上行號（由 1 開始），然後接上 ":"（半形冒號）及一個空格。在列印內容時，應除去開頭與結尾的空白。但不應該對內容做其他修改。

所有輸入檔案皆為 UTF-8 編碼。

範例輸入

```
testfile1.txt
class    bytearray
```

範例輸出

```
----Match 1
    @68:
    @69: class bytearray([source[, encoding[, errors]]])
    @70: Return a new array of bytes. The bytearray class is a
    mutable sequence of integers in the range 0 <= x < 256. It has
    most of the usual methods of mutable sequences, described in
    Mutable Sequence Types, as well as most methods that the bytes
    type has, see Bytes and Bytearray Operations.
```

範例輸入

```
testfile2.txt
march      24
```

範例輸出

```
----Match 1
  @89: Reply8 RecommendShareFlag
  @90: Sati commented March 24
  @91: S
----Match 2
  @92: Sati
  @93: NYCMarch 24
  @94: Children need to learn the relationship between
responsibility and freedom. I find parents today go overboard
with freedom and venture timidly, if at all, into the realm of
responsibility. Over the years of raising my own children and
having many kids of all ages over to my house, I have been stunned
by the lack of training and education in responsibility when it
comes to simple table manners, household chores, communicating
with adults, respecting the ways of the home. Many kids show up
clearly with no clue how to manage without mommy or daddy there to
do it all for them. I scratch my head wondering what these
parents are thinking...are they planning to have their children
live with them forever?
----Match 3
  @96: Reply6 RecommendShareFlag
  @97: Patricia Gonzalez commented March 24
  @98: P
----Match 4
  @99: Patricia Gonzalez
  @100: Costa RicaMarch 24
  @101: Excellent advice every parent should follow! My 9 year
old daughter brings me my water without me asking and place it on
a pretty coaster next to me when I sit to watch some TV. She
always gets me things when I ask her with a good attitude and
promptly. Just last week, she made dinner (something simple) for
the first time for us her parents, and started making me salads.
She gets excellent grades, she is very kind and works hard at
school. Some people have told me that I am very lucky she is the
way she is. Yet, because she is an only child and has more toys
than some of her classmates, and I try to always treat her kindly
and with respect, other people think she is spoiled. No: she is
not the way she is out of luck: we discipline her when needed.
Neither is she spoiled: we just give her a lot of love and
assurance that she is just fine the way she is. I also daily,
since she was a baby, spend quality time with her, listening to
her and trying to follow most of the advice in this article, from
validating her feelings to guiding her to find her own solutions.
It is daily work and sometimes very difficult, but as my husband
and I were eating the dinner she made for us with so much love,
everything was worth it.
```

----Match 5
@103: Reply9 RecommendShareFlag
@104: john commented March 24
@105: J

----Match 6
@106: john
@107: Toronto, OntarioMarch 24
@108: The presumption, without evidence, is that all that snowplowing for rich kids is counterproductive.

----Match 7
@111: Reply5 RecommendShareFlag
@112: Jean Lawless commented March 24
@113: J

----Match 8
@114: Jean Lawless
@115: New JerseyMarch 24
@116: When my parents and I were visiting one of my cousins, she told the story about when she was 16 she had a job in midtown Manhattan and at lunch break she would go to mass at St. Patrick's cathedral. One day she saw her grandfather there and thought, 'what a coincidence.' My mother, her aunt replied, 'What makes you think he wasn't keeping an eye on you?'. She was 16 in 1954.

----Match 9
@118: Reply3 RecommendShareFlag
@119: Meena commented March 24
@120: M

----Match 10
@121: Meena
@122: CaMarch 24
@123: The biggest reason some parents turn into snowplows and wade into illegal short cuts to push their children into a certain college or profession is because they have a chip on their shoulders. Perhaps they did not do as well academically and now wish to garner praise for themselves through their children. If they did well, then perhaps they measured themselves as they were reflected in other peoples eyes, never stopping to actually consider their self worth. Their children would be pushed through the same parental path, for blinded, they know no other.

----Match 11
@135: 1 REPLY
@136: Mo commented March 24
@137: M

----Match 12
@138: Mo
@139: CaliforniaMarch 24
@140: @Concerned! Whatever works as an incentive to get him on track to managing his own finances. Although, if he's an unmarried person in the Army, even as an E1 he has all his basics taken care of. He doesn't really need you to subsidize his expenses, and the Army has financial management training classes that he can take to learn about spending, saving, and investment for later use.

----Match 13
@259: 2 REPLIES
@260: historyRepeated commented March 24

```

    @261: H
----Match 14
    @262: historyRepeated
    @263: MassachusettsMarch 24
    @264: Believe me, employers pick intelligent, hard working
employees. A company can't be successful without them. Of course
there are always the status newbie hires, but the game is
relationships at that point.
----Match 15
    @383: Reply3 RecommendShareFlag
    @384: Tom Burns commented March 24
    @385: T
----Match 16
    @386: Tom Burns
    @387: Wilbraham, MAMarch 24
    @388: I'm glad to see the Parent Effectiveness Training skills
we learned in the 1970's are still relevant. Active listening is
still a worthwhile and helpful way to interact with most people
including our children.

```

範例輸入

```

testfile3.txt
Ms.      lepera

```

範例輸出

```

----Match 1
    @103:
    @104: "There's no question in my mind that there has been a
chilling effect," Ms. Lepera said. "People have thrown a lot of
weight behind this – more weight than it deserves. Defendants may
be more inclined not to put up a fight."
    @105:

```

範例輸入

```

testfile4.txt
手工業

```

範例輸出

```

----Match 1
    @35: 9.1      農業
    @36: 9.2      手工業
    @37: 9.3      商業
----Match 2
    @435:

```


@436: 手工業

@437:

----Match 3

@438: 唐三彩的普遍造型一立馬

@439: 唐代手工業分官營和私營兩種。工部是主管官營手工業的最重要部門，直接管理的機構有少府監、將作監、軍器監。少府監主管精緻手工藝品；將作監主管土木工程的興建；軍器監負責兵器的建造。監下設署、署下設作坊。此外還有鑄錢監和冶監等。官營手工業的產品一般不對外銷售，只供皇室和衙門消費。工人則分為工匠、刑徒、官奴婢、官戶、雜戶等。私營手工業較官營手工業比不發達。唐前期主要手工業有紡織業、陶瓷業和礦冶業[80]:107。絲、麻為主要紡織對象。河南道的絹，江淮的布都是其中的上等品種。唐朝的絲織品廣泛沿用北朝的蠟纈法染色，並先後研發出來纈、絞纈兩種新染色法。織品圖案亦受西域胡風影響體現出少許波斯風格。白瓷的精細，唐三彩的數量可以證實當時陶瓷業之發達。唐三彩以黃、綠、白三色為主，表現當時對施釉技術的熟練掌握，雖是隨葬物品，但製作精緻，取材涉及唐代社會上下的方方面面。金銀器製造業汲取西域的一些技術，採用灰吹法達到很高的金銀純度。淮南揚州出產方丈鏡、江心鏡等上等銅鏡。唐朝中期，南方手工業大幅進步，特別是絲織業、造紙業和造船業：民間普及飼養桑蠶，開闢用竹造紙，製造人力腳踏輪船[40]。越州越窯燒制出的秘色瓷是唐朝後期南方陶瓷業的傑出代表[80][81]。

@440:

本題有 30 分依據程式運算的正確性給分。一筆測試資料佔 2 分。剩下的分數會在下一次作業時給同學們練習同儕互評。其他同學會檢閱你的程式，依照你程式的設計、運算邏輯、可讀性，可擴充性等給分。請寫一個「好」的程式吧！