

國立政治大學 114 學年度第二學期 統計學(二) 期中 R 程式加分考

系級: _____ 學號: _____ 姓名: _____

考試科目: 統計學(二)

考試日期: 2026/04/14

本試題共 6 大題 (共 120%)

考試時間: 15:00~16:00 (共 60 分鐘)

注意事項:

1. 從教學網站下載電子考卷 (**114-2-Stat-R-Midterm.zip**), 並於自己的筆電解壓縮。
壓縮檔包含題目卷、答案卷和資料集。
2. 本次考題以 R 程式(Rgui 或 RStudio)方式作答, 其他程式不允許。
3. 考試過程中可查詢書本、教學講義或上網, 禁止利用 messenger, IG, Line 等等通訊軟體。
4. **禁止使用 AI 模式搜尋。禁止使用 chatGPT 或類似的 AI 平台/工具。禁止疑似作弊行為。**
1. 本答案卷上請務必於 **R Console** 內複製「**執行後的程式碼及結果(含圖形)**」, 於本答案卷貼上(**Courier New, 10 點字, 白底黑字**), **不是只有程式碼, 不是只有報表**。最後, 將每小題之**答案以黃色底高亮起來(不能只印出報表, 要助教去找答案)**。
5. 請依序註明題號: (1)a, (1)b, (2)a 等等。
6. 作答完請將此 word 檔存檔, 檔名為「學號-姓名-Stat-R-Midterm.docx」(更改成自己「學號、姓名」)並上傳至教學網站【作業考試上傳區】或 <http://hmwu.nccu.edu.tw/login.html>
7. 帳號: stat114, 密碼: 上課教室號碼, 資料夾: 「20260414-Midterm」
8. 如果上傳網站出現「空白頁」, 請將滑鼠移至「網址列」後, 按「Enter」即可。若再不行, 請換其它瀏覽器(IE/Edge/Firefox/Chrome)
9. 上傳檔案無法刪除, 若要上傳更新檔, 請於主檔名後加「-2」, 例如: 「學號-姓名-Stat-R-Midterm-2.docx」。

祝考試順利

(本檔案內容所述過程, 適合期中考、期末考。)

如何上傳答案卷?

Step 1: 先檢查案名稱是否正確(改為自己的學號-姓名): 學號-姓名-Stat-R-Midterm.docx
(例如: 1234567-吳漢銘-Stat-R-Midterm.docx)

Step 2: 至教師網站, 點選「【作業考試上傳區】(Upload)」或
<http://hmwu.nccu.edu.tw/login.html>



Step 3: 輸入帳號(stat114)和密碼: stat114 and password: 26xxxx



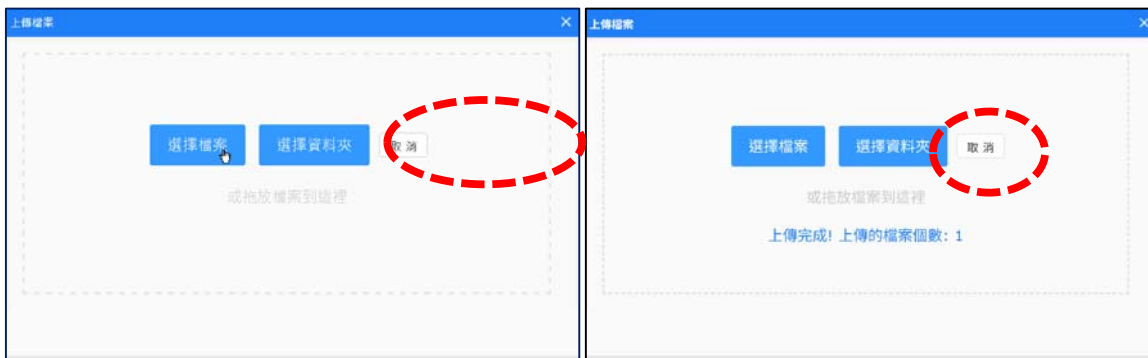
Step 4: 上傳前, 先點選進入正確的資料夾:



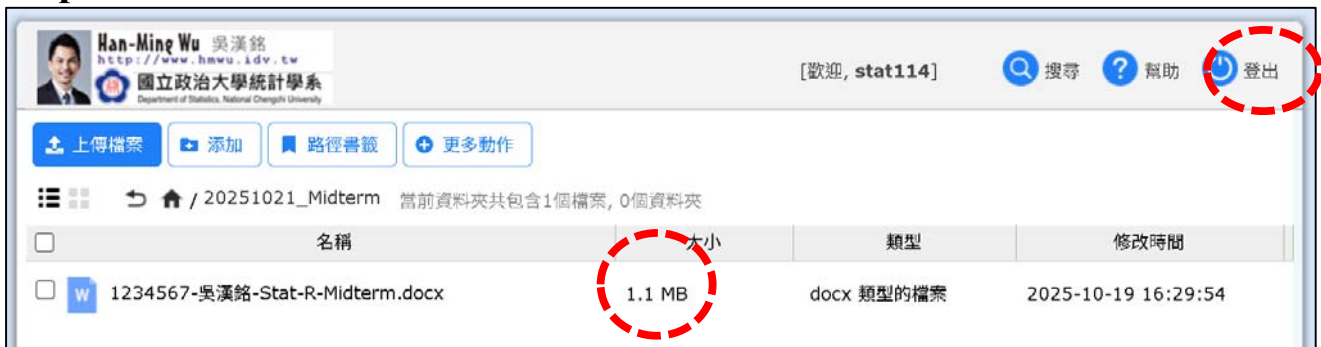
Step 5: 點選「上傳檔案」。



Step 6: 選取答案卷(勿選錯)。上傳完成後，請關閉上傳檔案視窗。



Step 7: 確認上傳檔案並登出。



如何作答?

請使用題目兼答題檔：學號-姓名-Stat-R-Midterm.docx

本答案卷上請務必於 **R Console** 內複製「執行後的程式碼及結果(含圖形)」，於本答案卷貼上 (Courier New, 10 點字, 白底黑字)，不是只有程式碼，不是只有報表，是 **R Console** 內的程式碼執行結果。最後，將每小題之答案以黃色底高亮起來(不能只印出報表，要助教去找答案)。

(1)

Data file: NCAA

NCAA Basketball Game Scores. A sample of 10 NCAA college basketball game scores provided the following data.

Winning Team	Points	Losing Team	Points	Winning Margin
Arizona	90	Oregon	66	24
Duke	85	Georgetown	66	19
Florida State	75	Wake Forest	70	5
Kansas	78	Colorado	57	21
Kentucky	71	Notre Dame	63	8
Louisville	65	Tennessee	62	3
Oklahoma State	72	Texas	66	6
Purdue	76	Michigan State	70	6
Stanford	77	Southern Cal	67	10
Wisconsin	76	Illinois	56	20

- Compute the mean and standard deviation for the points scored by the winning teams.
- Assume that the points scored by the winning teams for all NCAA games follow a bell-shaped distribution. Using the mean and standard deviation found in part (a), estimate the percentage of all NCAA games in which the winning team scores 84 or more points. Estimate the percentage of NCAA games in which the winning team scores more than 90 points.
- Compute the mean and standard deviation for the winning margin. Do the data contain outliers? Explain.

```

> # 1(a)
> library(readxl)
> NCAA <- read_excel("data/NCAA.xlsx")
> head(NCAA)
# A tibble: 6 × 5
  WinningTeam PointsW LosingTeam PointsL WinningMargin
  <chr>         <dbl> <chr>         <dbl>         <dbl>
1 Arizona      90 Oregon        66            24
2 Duke         85 Georgetown    66            19
3 Florida State 75 Wake Forrest 70             5
4 Kansas       78 Colorado      57            21
5 Kentucky     71 Notre Dame    63             8
6 Louisville   65 Tennessee    62             3
> mean(NCAA$PointsW)
[1] 76.5
> sd(NCAA$PointsW)
[1] 7.011895
>
> # 1(b)
> xbar <- mean(NCAA$PointsW)
> s <- sd(NCAA$PointsW)
> z <- (84 - xbar) / s
> z # about one-sd
[1] 1.069611
> cat("The percentage of all NCAA games in which the winning team scores 84 or more
points is: ", (100 - 68)/2, "%.")
The percentage of all NCAA games in which the winning team scores 84 or more points
is: 16 %.
> z <- (90 - xbar) / s
> z # about two-sd
[1] 1.9253
> cat("The percentage of NCAA games in which the winning team
+ scores more than 90 points: ", (100 - 95)/2, "%.")
The percentage of NCAA games in which the winning team
scores more than 90 points: 2.5 %.
>
> # 1(c)
> xbar_wm <- mean(NCAA$WinningMargin )
> xbar_wm
[1] 12.2
> s_wm <- sd(NCAA$WinningMargin)
> s_wm
[1] 7.885289
>
> Detect_Outlier <- function(x){
+   Q1 <- quantile(x, type = 6, probs = 0.25)
+   Q3 <- quantile(x, type = 6, probs = 0.75)
+   IQR.x <- IQR(x, type = 6)
+   Lower.Limit <- Q1 - 1.5 * IQR.x
+   Upper.Limit <- Q3 + 1.5 * IQR.x
+   ifelse(x < Lower.Limit | x > Upper.Limit, "Outlier", "Not")
+ }
> Detect_Outlier(NCAA$WinningMargin)
[1] "Not" "Not" "Not" "Not" "Not" "Not" "Not" "Not" "Not" "Not"
> cat("The data did not contain outliers.")
The data did not contain outliers.

```