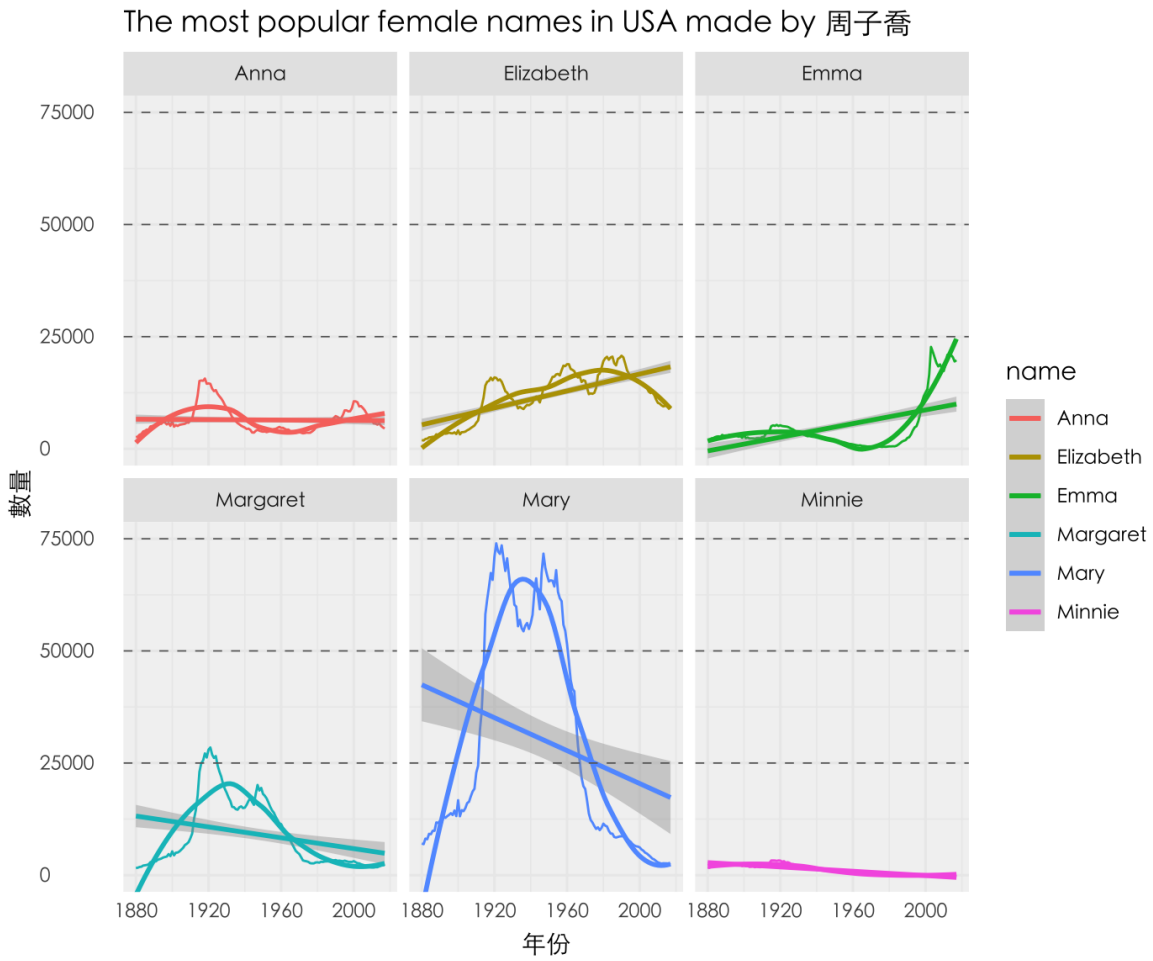
第一題code

```
library(babynames)
library(ggplot2)
library(dplyr)
library(showtext)

# 加入中文字型
font_add("cw", "/System/Library/Fonts/Supplemental/STHeiti Light.ttc")
showtext_auto()
theme_set(theme_minimal(base_family = "cw"))

# 選擇名字
names_to_plot <- c("Anna", "Elizabeth", "Emma", "Margaret", "Mary", "Minnie")

# 篩選資料
plot_data <- babynames %>%
  filter(sex == "F", name %in% names_to_plot)

# 繪圖
ggplot(plot_data, aes(x = year, y = n, color = name)) +
  geom_line() +  # 原始趨勢線
  geom_smooth(se = TRUE, method = "lm") +  # 線性回歸線
  geom_smooth(se = FALSE, method = "loess", linewidth = 1) +  # 平滑回歸線（顯示信賴區間）

  geom_hline(yintercept = c(25000, 50000, 75000),
             color = "gray40", linetype = "dashed", linewidth = 0.3) +

  facet_wrap(~ name, ncol = 3, scales = "fixed") +
  coord_cartesian(ylim = c(0, 75000)) +
  scale_y_continuous(breaks = c(0, 25000, 50000, 75000)) +

  labs(
    title = "The most popular female names in USA made by 周子喬",
    x = "年份", y = "數量"
  ) +

  theme_minimal(base_family = "cw") +
```

```
theme(
  panel.background = element_rect(fill = "gray95", color = NA),
  strip.background = element_rect(fill = "gray90", color = NA),
  strip.text = element_text(face = "bold"),
  axis.text.y = element_text(hjust = 0)
)
```

第一題output

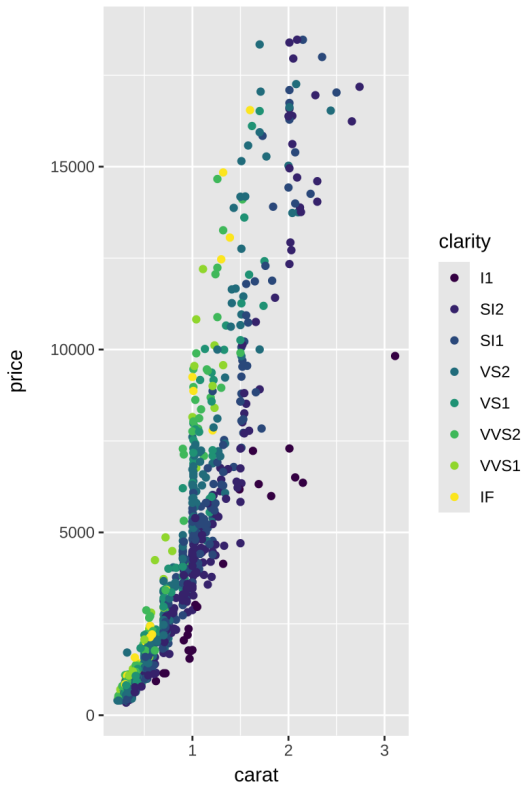


第二題code

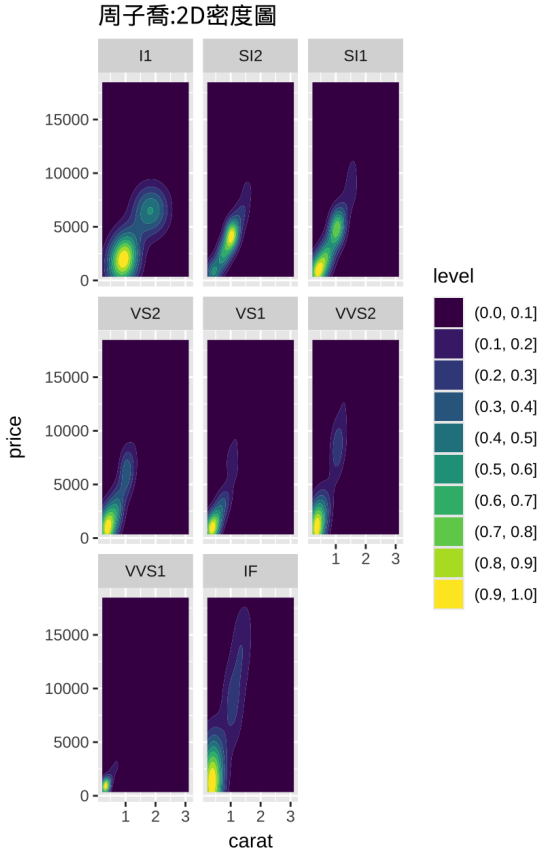
```
library(ggplot2)
library(patchwork)
library(showtext)

showtext_auto()
font_add("cw", "/System/Library/Fonts/Supplemental/Songti.ttc")

theme_set(theme_gray(base_family = "cw"))

set.seed(4393)
dsmall <- diamonds[sample(nrow(diamonds), 1000), ]

# A圖：散佈圖，carat vs price，顏色代表clarity
p1 <- ggplot(dsmall, aes(x = carat, y = price, color = clarity)) +
  geom_point() +
  labs(title = "周子喬:散佈圖")+
  theme_gray()


# B圖：2D密度圖（facet by clarity）
p2 <- ggplot(dsmall, aes(x = carat, y = price)) +
  geom_density_2d_filled(contour_var = "ndensity") +
  facet_wrap(vars(clarity)) +
  labs(title = "周子喬:2D密度圖") +
  theme_gray()
p1 + p2 + plot_annotation(tag_levels = "A")
```

第二題output

A


周子喬:散佈圖
price
carat
clarity
I1
SI2
SI1
VS2
VS1
VVS2
VVS1
IF
0
5000
10000
15000
1
2
3

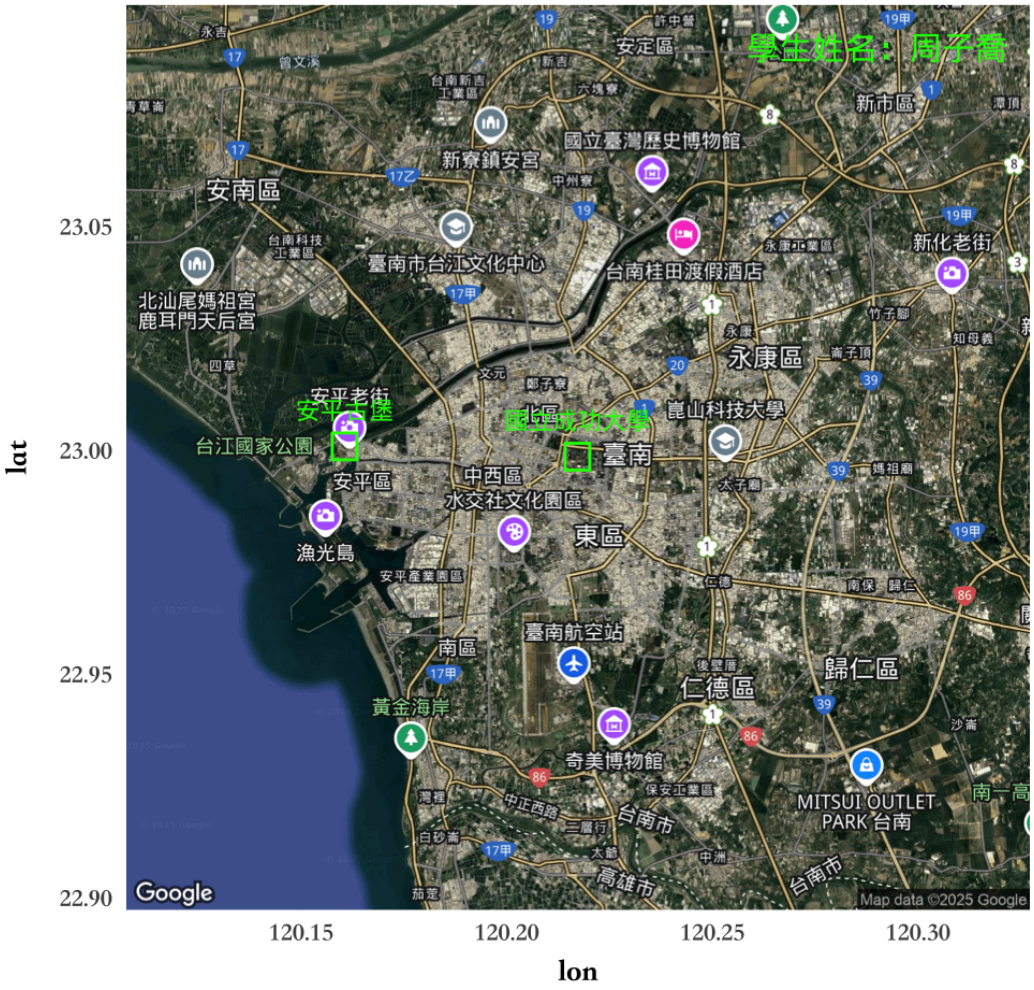
B


周子喬:2D密度圖
I1
SI2
SI1
VS2
VS1
VVS2
VVS1
IF
price
carat
level
(0.0, 0.1]
(0.1, 0.2]
(0.2, 0.3]
(0.3, 0.4]
(0.4, 0.5]
(0.5, 0.6]
(0.6, 0.7]
(0.7, 0.8]
(0.8, 0.9]
(0.9, 1.0]

第三題code

```
library(ggplot2)
library(dplyr)
library(maps)
library(ggmap)
library(mapproj)

# 成大座標範圍
lon.v1 = c(120.217172 - 0.003, 120.217172 + 0.003, 120.217172 + 0.003, 120.217172 - 0.003, 120.217172 - 0.003)
lat.v1 = c(22.998808 + 0.003, 22.998808 + 0.003, 22.998808 - 0.003, 22.998808 - 0.003, 22.998808 + 0.003)
ncku.coords = data.frame(lon = lon.v1, lat = lat.v1)

# 安平古堡座標（23°00′04″N, 120°09′38″E → 23.001111, 120.160556）
lon.v2 = c(120.160556 - 0.003, 120.160556 + 0.003, 120.160556 + 0.003, 120.160556 - 0.003, 120.160556 - 0.003)
lat.v2 = c(23.001111 + 0.003, 23.001111 + 0.003, 23.001111 - 0.003, 23.001111 - 0.003, 23.001111 + 0.003)
anping.coords = data.frame(lon = lon.v2, lat = lat.v2)

# 繪圖
ggmap(tw.map.ncku.hybrid) +
  # 成大
  geom_polygon(data = ncku.coords, aes(x = lon, y = lat), fill = NA, colour = "green") +
  annotate("text", label = "國立成功大學", x = 120.217172, y = 22.998808 + 0.008,
           size = 3, fontface = "bold", colour = "green") +

  # 安平古堡
  geom_polygon(data = anping.coords, aes(x = lon, y = lat), fill = NA, colour = "green") +
  annotate("text", label = "安平古堡", x = 120.160556, y = 23.001111 + 0.008,
           size = 3, fontface = "bold", colour = "green")+

  annotate("text", x = 120.29, y = 23.09,
           label = "學生姓名：周子喬", colour = "green", size = 4, fontface = "bold")
```

第三題output


學生姓名：周子蕾
安定區
新市區
國立臺灣歷史博物館
新營鎮安宮
安南區
臺南市台江文化中心
台南桂田渡假酒店
新化老街
北汕尾媽祖宮
鹿耳門天后宮
永康區
安平古堡
國立成功大學
崑山科技大學
台江國家公園
臺南
中西區
安平區
水交社文化園區
東區
漁光島
臺南航空站
南區
仁德區
歸仁區
黃金海岸
奇美博物館
MITSUI OUTLET PARK 台南
台南市
高雄市
Google
Map data ©2025 Google
23.05
23.00
22.95
22.90
lat
120.15
120.20
120.25
120.30
lon