**12장 연습문제 정답**

**1.**

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| import csv  import matplotlib.pyplot as plt  from matplotlib import rc  f = open('cafe\_2year.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  xdata = []  ydata = []  count = 1  for line in lines:  if count%3 == 0 :  xdata.append(line[0])  ydata.append(line[1])  count += 1    rc('font', family='Malgun Gothic')  font1 = {'size':18, 'color':'green'}  plt.bar(xdata, ydata)  plt.title('전국의 월별 까페수', fontdict=font1)  plt.xlabel('년월')  plt.ylabel('카페수')  plt.show()    f.close() |

**2.**

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| import csv  f = open('doctor\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  # 서울, 부산, 대구, 인천, 대전, 광주, 울산  area = ['서울', '부산', '대구', '인천', '대전', '광주', '울산']  doctor = ([[0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0],  [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0]])  for line in lines:  if line[0] == '서울' :  doctor[0][0] += int(line[2])  doctor[0][1]+= int(line[3])  doctor[0][2] += int(line[4])  doctor[0][3] += int(line[5])    if line[0] == '부산' :  doctor[1][0] += int(line[2])  doctor[1][1]+= int(line[3])  doctor[1][2] += int(line[4])  doctor[1][3] += int(line[5])    if line[0] == '대구' :  doctor[2][0] += int(line[2])  doctor[2][1]+= int(line[3])  doctor[2][2] += int(line[4])  doctor[2][3] += int(line[5])    if line[0] == '인천' :  doctor[3][0] += int(line[2])  doctor[3][1]+= int(line[3])  doctor[3][2] += int(line[4])  doctor[3][3] += int(line[5])    if line[0] == '대전' :  doctor[4][0] += int(line[2])  doctor[4][1]+= int(line[3])  doctor[4][2] += int(line[4])  doctor[4][3] += int(line[5])    if line[0] == '광주' :  doctor[5][0] += int(line[2])  doctor[5][1]+= int(line[3])  doctor[5][2] += int(line[4])  doctor[5][3] += int(line[5])    if line[0] == '울산' :  doctor[6][0] += int(line[2])  doctor[6][1]+= int(line[3])  doctor[6][2] += int(line[4])  doctor[6][3] += int(line[5])    print(header[0], header[2], header[3], header[4], header[5])  for i in range(7) :  print(area[i], end=' ')  for j in range(4) :  print('%8d' % doctor[i][j], end=' ')    print()  f.close() |

**3.**

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| --- |
| import csv  f = open('doctor\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  # 서울, 부산, 대구, 인천, 대전, 광주, 울산  area = ['서울', '부산', '대구', '인천', '대전', '광주', '울산']  doctor = ([[0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0],  [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0]])  for line in lines:  if line[0] == '서울' :  doctor[0][0] += int(line[2])  doctor[0][1]+= int(line[3])  doctor[0][2] += int(line[4])  doctor[0][3] += int(line[5])    if line[0] == '부산' :  doctor[1][0] += int(line[2])  doctor[1][1]+= int(line[3])  doctor[1][2] += int(line[4])  doctor[1][3] += int(line[5])    if line[0] == '대구' :  doctor[2][0] += int(line[2])  doctor[2][1]+= int(line[3])  doctor[2][2] += int(line[4])  doctor[2][3] += int(line[5])    if line[0] == '인천' :  doctor[3][0] += int(line[2])  doctor[3][1]+= int(line[3])  doctor[3][2] += int(line[4])  doctor[3][3] += int(line[5])    if line[0] == '대전' :  doctor[4][0] += int(line[2])  doctor[4][1]+= int(line[3])  doctor[4][2] += int(line[4])  doctor[4][3] += int(line[5])    if line[0] == '광주' :  doctor[5][0] += int(line[2])  doctor[5][1]+= int(line[3])  doctor[5][2] += int(line[4])  doctor[5][3] += int(line[5])    if line[0] == '울산' :  doctor[6][0] += int(line[2])  doctor[6][1]+= int(line[3])  doctor[6][2] += int(line[4])  doctor[6][3] += int(line[5])  f2 = open('doctor2.csv', 'w', encoding='utf-8', newline='')  wr = csv.writer(f2)  wr.writerow(['지역', '일반의 수', '인턴 수', '레지던트 수', '전문의 수'])  for i in range(7) :  wr.writerow([area[i], doctor[i][0], doctor[i][1], doctor[i][2], doctor[i][3]])    print('doctor2.csv 파일 쓰기 완료!')  f.close()  f2.close() |

**4.**

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| import csv  import matplotlib.pyplot as plt  from matplotlib import rc  f = open('doctor2.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  xdata = []  ydata = []  for line in lines:  xdata.append(line[0])  ydata.append(int(line[4]))  rc('font', family='Malgun Gothic')  font1 = {'size':18, 'color':'green'}  plt.scatter(xdata, ydata)  plt.title('서울 및 광역시 종합병원 전문의 수', fontdict=font1)  plt.xlabel('시')  plt.ylabel('의사 수')  plt.show()    f.close() |

**5.**

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| import csv  import matplotlib.pyplot as plt  from matplotlib import rc  f = open('doctor2.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  xdata = []  ydata1 = []  ydata2 = []  ydata3 = []  ydata4 = []  for line in lines:  xdata.append(line[0])  ydata1.append(int(line[1]))  ydata2.append(int(line[2]))  ydata3.append(int(line[3]))  ydata4.append(int(line[4]))  rc('font', family='Malgun Gothic')  font1 = {'size':18, 'color':'green'}  plt.plot(xdata, ydata1, label='일반의', color='red', linestyle='-', marker='o')  plt.plot(xdata, ydata2, label='인턴', color='blue', linestyle='--', marker='x')  plt.plot(xdata, ydata3, label='레지던트', color='yellow', linestyle=':', marker='s')  plt.plot(xdata, ydata4, label='전문의', color='purple', linestyle='-.', marker='d')  plt.title('서울 및 광역시 종합병원 의사 수', fontdict=font1)  plt.legend(loc='best')  plt.xlabel('시')  plt.ylabel('의사 수')  plt.show()    f.close() |

**5.**

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| import csv  import matplotlib.pyplot as plt  from matplotlib import rc  f = open('doctor2.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  xdata = []  ydata1 = []  ydata2 = []  ydata3 = []  ydata4 = []  for line in lines:  xdata.append(line[0])  ydata1.append(int(line[1]))  ydata2.append(int(line[2]))  ydata3.append(int(line[3]))  ydata4.append(int(line[4]))  rc('font', family='Malgun Gothic')  font1 = {'size':18, 'color':'green'}  plt.plot(xdata, ydata1, label='일반의', color='red', linestyle='-', marker='o')  plt.plot(xdata, ydata2, label='인턴', color='blue', linestyle='--', marker='x')  plt.plot(xdata, ydata3, label='레지던트', color='yellow', linestyle=':', marker='s')  plt.plot(xdata, ydata4, label='전문의', color='purple', linestyle='-.', marker='d')  plt.title('서울 및 광역시 종합병원 의사 수', fontdict=font1)  plt.legend(loc='best')  plt.xlabel('시')  plt.ylabel('의사 수')  plt.show()    f.close() |

**6.**

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| --- |
| import csv  import matplotlib.pyplot as plt  from matplotlib import rc  f = open('doctor2.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  kind = ['일반의', '인턴', '레지던트', '전문의']  numbers = []  seoul = next(lines)  total = 0  for i in range(4) :  total += int(seoul[i+1])    for i in range(4) :  persent = int(seoul[i+1])/total;  numbers.append(persent)  plt.pie(numbers, explode=(0, 0.1, 0, 0), labels=kind, autopct='%.1f%%', shadow=True, startangle=90)  plt.title('서울 종합병원 의사 유형별 분포', fontdict=font1)  plt.show()    f.close() |