**13장 연습문제 정답**

**1.**

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| import csv  f = open('high\_school\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  next(lines)  list\_data = []  for line in lines :  list\_data.append(line[:])  print(list\_data)  f.close() |

**2.**

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| import csv  import numpy as np  f = open('high\_school\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  list\_data = []  for line in lines :  list\_data.append(line[:])  length = len(list\_data)  data = np.zeros((length, 6), dtype='int32')  for i in range(length) :  for j in range(6) :  data[i][j] = list\_data[i][j+2]    print('-'\*60)  for i in range(6) :  print(header[i+2], end=' ')  print()  print('-'\*60)  print(data)  f.close()  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  import numpy as np  f = open('high\_school\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  list\_data = []  for line in lines :  list\_data.append(line[:])  length = len(list\_data)  data = np.zeros((length, 6), dtype='int32')  for i in range(length) :  for j in range(6) :  data[i][j] = list\_data[i][j+2]  data = np.insert(data, 6, 0, axis=1)  row = data.shape[0]  for i in range(row) :  sum = data[i][1] + data[i][3] + data[i][5]  data[i][6] = sum  print('-'\*60)  for i in range(6) :  print(header[i+2], end=' ')  print('총 학생수')  print('-'\*60)  print(data)  f.close() |

**4.**

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| import csv  import numpy as np  import matplotlib.pyplot as plt  from matplotlib import rc  rc('font', family='Malgun Gothic')  f = open('high\_school\_2019.csv', 'r', encoding='utf-8')  lines = csv.reader(f)  header = next(lines)  list\_data = []  for line in lines :  list\_data.append(line[:])  length = len(list\_data)  data = np.zeros((length, 6), dtype='int32')  for i in range(length) :  for j in range(6) :  data[i][j] = list\_data[i][j+2]  data\_sum = np.sum(data, axis=0)  print('1학년 총 학생수 :', data\_sum[1])  print('2학년 총 학생수 :', data\_sum[3])  print('3학년 총 학생수 :', data\_sum[5])  xdata = ['1학년', '2학년', '3학년']  plt.bar(xdata, [data\_sum[1], data\_sum[3], data\_sum[5]])  plt.title('전국 고등학교 학년별 총 학생수')  plt.show()  f.close() |