**数据结构实验报告15**

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**实验名称**： 程序设计方法论

**实验要求：了解计算思维的概念，掌握自顶向下的设计方法，掌握自底向上的执行过程，了解计算生态和模块编程思想，掌握第三方库的安装方法，掌握Python源文件的打包方法。**

**算法实现和实验结果：**

1. **爬微信朋友圈**

**import itchatimport numpy as npimport matplotlib.pyplot as pltimport matplotlib as mplimport reimport jiebaimport PIL.Image as Imagefrom wordcloud import WordCloud, ImageColorGenerator#登录朋友圈def login(): itchat.login() friends=itchat.get\_friends(update=True)[0:] return friends#获取朋友圈数据def get\_var(var, friends): variable = [] for i in friends: value = i[var] variable.append(value) return variable#朋友圈性别比例def analyseGender(friends): male=female=other=0 sexes = get\_var('Sex', friends) for sex in sexes: if sex == 1: male += 1 elif sex == 2: female += 1 else: other += 1 total = len(friends[1:]) malecol = round( float(male)/total \* 100, 2) femalecol = round( float(female)/total \* 100, 2) othercol = round( float(other)/total \* 100, 2) print('男性好友：{:.2f}%%'.format( malecol)) print('女性好友：{:.2f}%%'.format( femalecol)) print('不明性别好友：{:.2f}%%'.format( othercol)) #plot code mpl.rcParams['font.sans-serif']=['SimHei'] mpl.rcParams['axes.unicode\_minus'] = False map = { 'Female':(malecol, '#7199cf'), 'Male': (femalecol, '#4fc4aa'), 'other': (othercol, '#e1a7a2') } fig = plt.figure( figsize=(5,5)) ax = fig.add\_subplot(111) ax.set\_title( '朋友圈性别') xticks = np.arange(3) + 0.15 bar\_width = 0.5 names = map.keys() values = [ x[0] for x in map.values()] colors = [ x[1] for x in map.values()] #柱状图 bars = ax.bar( xticks, values, width=bar\_width, edgecolor='none') ax.set\_ylabel('比例') ax.set\_xlabel('性别') ax.grid() ax.set\_xticks( xticks) ax.set\_xticklabels( names) ax.set\_xlim( [bar\_width/2 - 0.5, 3 - bar\_width/2]) ax.set\_ylim( [0, 100]) for bar, color in zip( bars, colors): bar.set\_color( color) height = bar.get\_height() plt.text( bar.get\_x(), bar.get\_height()/4.+ height, '{:.2f}%'.format( float(height))) plt.show() #饼状图 fig1 = plt.figure( figsize=(5,5)) ax = fig1.add\_subplot(111) ax.set\_title('饼图') labels = ['{}\n{}%'.format(name, value) for name, value in zip( names, values)] ax.pie(values, labels=labels, colors=colors) plt.show()def analyseProvince(friends): provlist = get\_var('Province', friends) provdict = {} for p in provlist: provdict[p] = provdict.get(p,0) + 1 provdict = sorted(provdict.items(), key= lambda x : x[1], reverse=True) #画图 figpro = plt.figure(figsize=(10,5)) axpro = figpro.add\_subplot(111) axpro.set\_title('省份') xticks = np.linspace(0.5,20,10) bar\_width = 0.8 pros= [] values = [] count = 0 for d in provdict: pros.append(d[0]) values.append(d[1]) count += 1 if count >= 10: break colors = ['#FFEC88', '#FFE4C4','#FFC125','#FFB6C1','#CDCDB4','#CDC8B1','#CDB79E','#CDAD00','#CD96CD',\ '#CD853F'] bars = axpro.bar( xticks, values, width=bar\_width, edgecolor='none') axpro.set\_ylabel('人数') axpro.set\_xlabel('省份') axpro.grid() axpro.set\_xticks( xticks) axpro.set\_xticklabels(pros) axpro.set\_xlim(0,20) axpro.set\_ylim([0,100]) for bar, color in zip( bars, colors): bar.set\_color(color) height = bar.get\_height() plt.text( bar.get\_x()+bar.get\_width()/4., height, '{}'.format(height)) plt.show()def drawWordcloudPlot(counts): coloring = np.array(Image.open("E:/baidupic/alice\_color.png")) wc = WordCloud(background\_color="white", max\_words=2000, mask=coloring, max\_font\_size=60, random\_state=42, scale=2, font\_path="c:/Windows/Fonts/SimHei.ttf") wc.generate\_from\_frequencies(counts) image\_colors = ImageColorGenerator(coloring) plt.imshow(wc) plt.axis("off") plt.savefig('friendSign.jpg') plt.show()def analyseSignature(friends): signatures = get\_var('Signature', friends) siglist = [] for sign in signatures: sign = sign.strip().replace("span", "").replace("class", "").replace("emoji", "") rep = re.compile("lf\d+\w\*|[<>/=]") sign = rep.sub("", sign) siglist.append(sign) text = "".join(siglist) wlist = jieba.cut(text, cut\_all=True) counts = {} for word in wlist: if len(word) == 1: continue else: counts[word] = counts.get(word, 0) + 1 wdict = {} for d in counts.items(): if d[1] > 2: wdict[d[0]] = d[1] drawWordcloudPlot(wdict)def main(): friends = login() analyseGender(friends) analyseProvince(friends) analyseSignature(friends)main()**

**2.**反思

1.计算思维的本质是抽象和自动化

2.自顶向下设计：printIntro()函数，getInput()函数，simNGames()函数（是整个函数的核心）🡪simOneGame函数🡪gameOver函数，printSummary()函数

3.A,B能力值和不一定为1

4.import要求源文件名称中不能出现英文句号（.）