

**DEPARTMENT OF COMPUTER SCIENCE**

**MID-TERM EXAM 1**

**(OPEN BOOK EXAM)**

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| Class: | **CPS563-02 – Data Visualization – Fall 2020** |
| Instructor: | **Dr. Tam Nguyen** |
| Date: |  |
| Student’s Name: |  |
| Student’s Email: |  |

***Plagiarism and cheating will not be tolerated. Copying the available code, chart, or figure from Internet sources is not allowed. Any student caught plagiarizing or cheating will not pass the class.***

**Instruction (Very Important)**

* ***This exam is due:*** **Oct 12, 2020** **11:15 AM**. You have 50 minutes for the exam and 15 minutes for your submission.
* You provide your answer in a separate doc/docx/txt/pdf file and you submit it as an assignment.
* Name your submission file after your UD username. For example: if your UD email is [abc1@udayton.edu](mailto:abc1@udayton.edu), then your UD username is **abc1**, and your submission filename is **abc1.doc** (or **abc1.docx**, **abc1.txt**, or **abc1.pdf**). Your submission will be ungraded if its filename is in the wrong format.
* Write your name on the first page of your answer script.
* There is no teamwork in the exam.
* Do not leave any question unanswered.

**Question 1**

Following are the population and demographic data based on analysis of the Census Bureau’s American Community Survey.

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| **Location** | **Children 0-18** | **Adults 19-25** | **Adults 26-34** | **Adults 35-54** | **Adults 55-64** | **Adults**  **65+** |
| Alabama | 1128300 | 419500 | 554400 | 1192600 | 646800 | 811000 |
| Alaska | 191100 | 62200 | 93400 | 182800 | 94100 | 85500 |
| Arizona | 1706300 | 645900 | 841100 | 1702900 | 862200 | 1245900 |
| Arkansas | 728600 | 255200 | 345400 | 722800 | 380200 | 489100 |
| California | 9324800 | 3594300 | 5299700 | 10212700 | 4737800 | 5576600 |
| Colorado | 1321800 | 495000 | 771700 | 1471200 | 700700 | 794800 |
| Connecticut | 767700 | 291600 | 387100 | 918600 | 510400 | 590900 |
| Delaware | 205800 | 76700 | 109700 | 233100 | 134400 | 177900 |
| District of Columbia | 130200 | 64400 | 141400 | 179400 | 69900 | 82600 |
| Florida | 4397300 | 1680500 | 2401900 | 5240300 | 2829800 | 4293700 |
| Georgia | 2610600 | 901500 | 1262600 | 2743500 | 1268300 | 1426400 |
| Hawaii | 312100 | 98400 | 167600 | 340100 | 178500 | 258100 |
| Idaho | 462600 | 150600 | 203200 | 414500 | 212900 | 275900 |
| Illinois | 2965600 | 1103100 | 1543200 | 3251000 | 1649800 | 1925700 |
| Indiana | 1609500 | 585500 | 762900 | 1648200 | 865400 | 1015400 |
| Iowa | 754700 | 272000 | 352500 | 747900 | 411700 | 517900 |
| Kansas | 727700 | 260300 | 325200 | 688300 | 371700 | 441600 |
| Kentucky | 1024400 | 388100 | 501600 | 1104200 | 591000 | 711100 |
| Louisiana | 1142700 | 408800 | 549800 | 1125800 | 592700 | 699600 |
| Maine | 250700 | 93700 | 140400 | 332500 | 214300 | 267900 |
| Maryland | 1378800 | 491800 | 712200 | 1573200 | 808400 | 906300 |
| Massachusetts | 1412700 | 581700 | 873100 | 1753300 | 936100 | 1103100 |
| Michigan | 2228200 | 890600 | 1151100 | 2431200 | 1392900 | 1676000 |
| Minnesota | 1336600 | 458400 | 685900 | 1398200 | 752600 | 857200 |
| Mississippi | 735000 | 262100 | 326400 | 717600 | 377300 | 461000 |
| Missouri | 1405600 | 519900 | 714300 | 1470900 | 823200 | 1000600 |
| Montana | 232800 | 84500 | 118800 | 247800 | 152000 | 198000 |
| Nebraska | 488400 | 161600 | 224800 | 460200 | 242200 | 291700 |
| Nevada | 707300 | 251100 | 386200 | 791200 | 373600 | 473900 |
| New Hampshire | 266500 | 106400 | 146700 | 341300 | 212100 | 237200 |
| New Jersey | 2025600 | 725800 | 1002400 | 2365900 | 1205500 | 1403100 |
| New Mexico | 499900 | 186400 | 239200 | 484500 | 271000 | 364300 |
| New York | 4182800 | 1648400 | 2552500 | 4945500 | 2573600 | 3114200 |
| North Carolina | 2383600 | 848600 | 1179600 | 2653900 | 1330700 | 1648100 |
| North Dakota | 176400 | 78600 | 99300 | 170000 | 96800 | 109600 |
| Ohio | 2662700 | 973600 | 1345900 | 2850100 | 1597400 | 1926100 |
| Oklahoma | 987400 | 333200 | 479300 | 932800 | 484900 | 598400 |
| Oregon | 898000 | 347300 | 531100 | 1066100 | 539100 | 729300 |
| Pennsylvania | 2720200 | 1027000 | 1475100 | 3119700 | 1794800 | 2251300 |
| Rhode Island | 207500 | 92700 | 128900 | 262200 | 147700 | 175000 |
| South Carolina | 1151000 | 423000 | 558000 | 1243300 | 673500 | 880900 |
| South Dakota | 219200 | 77100 | 96400 | 200300 | 116700 | 139000 |
| Tennessee | 1557800 | 571500 | 788700 | 1709100 | 884500 | 1074700 |
| Texas | 7705100 | 2642800 | 3631000 | 7333600 | 3200800 | 3510700 |
| Utah | 966500 | 337300 | 403600 | 756700 | 298400 | 343200 |
| Vermont | 117000 | 48400 | 68700 | 151600 | 95700 | 119200 |
| Virginia | 1932900 | 702300 | 997000 | 2167600 | 1086400 | 1295800 |
| Washington | 1710100 | 622000 | 1023700 | 1913600 | 955800 | 1142800 |
| West Virginia | 373600 | 143300 | 184300 | 443100 | 255300 | 352700 |
| Wisconsin | 1309600 | 489400 | 644200 | 1446800 | 817100 | 955800 |
| Wyoming | 135900 | 46600 | 67500 | 136700 | 78800 | 94900 |

1. **Which chart do you choose to plot the given data? Explain why.**

**Provide your answer to the following box. (10 points)**

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| Stacked Bar Chart can be used for plotting the above data. In Stacked Bar chart we have two or more quantitative dependent varies on y axis and independent variables on x axis. So for that reason we have plotted population on the y axis and states on the y axis. For easy understanding we having added an legend |

1. **Visualize the given data with your chosen graph/chart in Excel. And paste your Excel chart to the following box. (10 points)**

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**Question 2**

As you know, CPS 563-Data Visualization course has 3 exams and 3 programming assignments with the following weights.

Mid-term 1: 15%

Mid-term 2: 15%

Final exam: 25%

Programming Assignments: 45%

1. **You are asked to write MATLAB code to plot a pie chart for the data mentioned above. Do not forget to include legend, chart title to the pie chart. Please paste your MATLAB code to the following box. (20 points)**

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| close all;  clear all;  clc;    Weightage = [15 15 25 45];  exams = {'Mid-term 1';'Mid-term 2';'Final exam';'Programming Assignments'};  p = pie(Weightage);  pText = findobj(p,'Type','text');  percentValues = get(pText,'String');  txt = exams;  combinedtxt = strcat(txt,": ");  combinedtxt2 = strcat(combinedtxt,percentValues);  for i=1:length(Weightage)  pText(i).String = combinedtxt2(i);  end  legend('Mid-term 1','Mid-term 2','Final exam','Programming Assignments');  set(legend,'Location','northeastoutside');  title( " Weightages of CPS 563-Data Visualization course"); |

1. **Please paste your pie chart figure to the following box. (10 points)**

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**Question 3**

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| --- | --- | --- | --- | --- | --- | --- |
| **Task Name** | **Start Date** | **End Date** | **Duration (Days)** | **Days Complete** | **Days Remaining** | **Percent Complete** |
| Task One | 7/25/2020 | **7/30/2020** | 5 | **2.50** | **2.50** | 50% |
| Task Two | 7/27/2020 | **8/1/2020** | 5 | **3.75** | **1.25** | 75% |
| Task Three | 7/27/2020 | **8/4/2020** | 8 | **2.00** | **6.00** | 25% |
| Task Four | 7/29/2020 | **8/6/2020** | 8 | **8.00** | **0.00** | 100% |
| Task Five | 8/1/2020 | **8/9/2020** | 8 | **6.00** | **2.00** | 75% |
| Task Six | 8/1/2020 | **8/5/2020** | 4 | **1.40** | **2.60** | 35% |
| Task Seven | 8/3/2020 | **8/10/2020** | 7 | **1.75** | **5.25** | 25% |
| Task Eight | 8/5/2020 | **8/12/2020** | 7 | **4.90** | **2.10** | 70% |
| Task Nine | 8/3/2020 | **8/9/2020** | 6 | **0.90** | **5.10** | 15% |

1. **Which chart do you choose to plot the given data above? Explain why. Provide your answer in the following box. (10 points)**

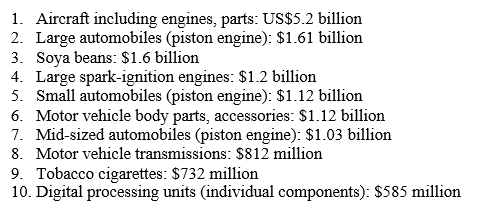
|  |
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| For ploting the project management related data we use Gantt charts. |

1. **Visualize your chosen graph in Excel. And paste your Excel graph/chart to the following box. (10 points)**

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**Question 4**

The following export products represent the highest dollar value in Ohio global shipments during 2018.



* 1. **You are required to write MATLAB code to visualize a treemap from the given data. Note that you must declare the export product data inside your MATLAB code. Do not load the datafrom external sources such as Excel files. Please paste your MATLAB code to the following box (20 points).**

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| close all;  clear all;  clc;  data = {'Aircraft including',5200 ; 'Large automobiles',1610 ; 'Soya beans', 1600 ; 'Large spark-ignition', 1200 ; 'Small automobiles', 1120 ; 'Motor vehicle body parts', 1120 ; 'Mid-sized automobiles', 1030 ; 'Motor vehicle', 812 ; 'Tobacco cigarettes', 732 ; 'Digital processing units', 585 };  colors = ones(10,3);  %colors = rand(10,3);  % n = length(data);  % colors = (jet(n)+1)/2;  % %colors = rand(10,3);  rectangles = treemap([data{:,2}]);  labels = data(:,1);  plotRectangles(rectangles,labels,colors);  outline(rectangles); |

* 1. **Visualize the treemap and paste your treemap figure to the following box. (10 points)**

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