UNIVERSITES AND COLLEGES AT UNITED STATES.

Math 240.SF1: Data Analysis

Final Project

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By

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INTRODUCTION

This paper examines the number of colleges and universities in the United States. This data

set contains universities' names, the number of degrees in each university, student’s tuition fees. I

describe how the scholarship amount influences the total tuition fees. Moreover, each university has

a different kind of percentage of scholarship amount for each student.

Although the students get a scholarship amount to reduce their fee structure, they have to

work for other expenses for their education. To overcome this issue, I created some independent

variables of on-campus jobs, working hours, salary in the dollar, etc.

In addition to this, I like to evaluate the total number of students admitted to each college, so

I created some other variables called the percentage of students admitted, the total number of seats

allocated by the US government, number of vacancy seats available.

**OBJECTIVE**

With my aforementioned goal in mind, I made my primary objective to determine

how the independent variable influences the dependent variable. Using an independent variable, I

evaluated the total number of colleges in each state, and how they are providing scholarship amounts

for the students and details of the score for lab hours. I provided all the details by using a pie chart,

scatter plot, regression analysis, t-test for paired variables, pivot table to identify the details for each

university in state wise, and descriptive statistics to identify the seat vacancies in each university.

US GOVERNMENT EDUCATION SYSTEM.

UNIID, INSTNM, CITY, MAIN, NMOFBRANCH, PREDGR, HRDEGR, SCHOLARSHIP AMT IN $,

PERCENTAGE OF STUD ADM, ACCOMMODATION FEES=10%(Tuit.Fe), HEALTH INSURANCE 5%(Tuit.Fee), TERM FEES $, REGION, PERCENTAGE OF STUD ADM-%, OFF CAMPUS JOB-WHRS, ON CAMPUS JOB-WHRS, OFF CAMPUS SALARY IN $,ON CAMPUS SALARY IN $,ON CAMPUS JOB(YES=1,NO=0), WEEKLY WORKING HRS, STD SALARY IN $, UNIVERSITY ACCOMMODATION (YES=1,NO=0)

|  |  |
| --- | --- |
| EXAMINATION FEES(50%(T.F), | LIB+COURSE FEE+OTHERS |

Using above data, we will calculate and perform the following functions:

1. Describing data visually:
2. Frequency distribution and Histograms.

Frequency Distributions:

A frequency distribution is a table formed by classifying n data values into k classes called bins. The bin limits define the values to be included in each bin.

Sturges’ Rule: k = 1 + 3.3 log (n)

In my data set contains n= 352.

k = 1 + 3.3 log (352)

Here I am taking a sample of Scholarship amount n= 352; x min= 1001

and x max =1999.

Histograms:

A histogram is a graphical representation of a frequency distribution. A histogram is a bar chart whose Y-axis shows the number of data values (or a percentage) within each bin of a frequency distribution and whose X-axis ticks show the end points of each bin.

1. Column and Bar charts.

A column chart is a vertical display of data and a bar chart is a horizontal display of data.

Here I am going to compare student’s salary of both on campus job and off campus job with the working hours using column and bar chart.

1. Pie charts:

A pie chart can only convey a general idea of the data because it is hard to assess areas precisely. It should have only a few slices (typically two to five) and the slices should be labeled with data values or percents. The only correct use of a pie chart is to portray data that sum to a total (e.g., percent market shares).

|  |  |
| --- | --- |
| Scholarship Amt in $ | 53298 |
| OFF CAMPUS JOB-WHRS | 55675 |
| ON CAMPUS SALARY IN | 60860 |

D. Pivot Tables:

PivotTable One of Excel’s most popular and powerful features is the pivot table, which provides interactive analysis of a data matrix. The simplest kind of pivot table has rows and columns. Each of its cells shows a statistic for a row and column combination. The row and column variables must be either categorical or discrete numerical and the variable for the table cells must be numerical.

|  |
| --- |
| **Row Labels** |
| **AK** |
| **Alaska Career College** |
| **Alaska Pacific University** |
| **AVTEC-Alaska's Institute of Technology** |
| **NEW CONCEPTS BEAUTY SCHOOL INC** |
| **Prince William Sound Community College** |
| **Sheldon Jackson College** |
| **University of Alaska Anchorage** |
| **University of Alaska Fairbanks** |
| **University of Alaska Southeast** |
| **AL** |
| **Alabama A & M University** |
| **ALABAMA AVIATION AND TECHNICAL COLLEGE** |
| **Alabama Southern Community College** |
| **Alabama State University** |
| **Amridge University** |
| **Athens State University** |
| **Auburn University** |
| **Auburn University at Montgomery** |
| **Bevill State Community College** |
| **BEVILL STATE COMMUNITY COLLEGE-WALKER COLLEGE CAMP** |
| **Birmingham Southern College** |
| **Bishop State Community College** |
| **Central Alabama Community College** |
| **Chattahoochee Valley Community College** |
| **CHAUNCEY SPARKS STATE TECHNICAL COLLEGE** |
| **Coastal Alabama Community College** |
| **Community College of the Air Force** |
| **Concordia College Alabama** |
| **Enterprise State Community College** |
| **FAULKNER UNIVERSITY** |
| **FAULKNER UNIVERSITY-BIRMINGHAM** |
| **FAULKNER UNIVERSITY-FLORENCE** |
| **Gadsden Business College** |
| **GADSDEN BUSINESS COLLEGE-ANNISTON** |
| **Gadsden State Community College** |
| **GADSDEN STATE COMMUNITY COLLEGE-AYERS CAMPUS** |
| **George C Wallace Community College-Dothan** |
| **George C Wallace State Community College-Hanceville** |
| **George C Wallace State Community College-Selma** |
| **H Councill Trenholm State Community College** |
| **H COUNCILL TRENHOLM STATE TECHNICAL COLLEGE-PATTER** |
| **Heritage Christian University** |
| **Herzing University-Birmingham** |
| **Huntingdon College** |
| **J. F. Drake State Community and Technical College** |
| **Jacksonville State University** |
| **Jefferson Davis Community College** |
| **Jefferson State Community College** |
| **John C Calhoun State Community College** |
| **Judson College** |
| **Lawson State Community College-Bessemer Campus** |
| **Lawson State Community College-Birmingham Campus** |
| **Lurleen B Wallace Community College** |
| **LURLEEN B WALLACE COMMUNITY COLLEGE-MACARTHUR CAMP** |
| **Marion Military Institute** |
| **Miles College** |
| **Northeast Alabama Community College** |
| **Northwest-Shoals Community College** |
| **Oakwood University** |
| **Reid State Technical College** |
| **Samford University** |
| **Shelton State Community College** |
| **Snead State Community College** |
| **South University-Montgomery** |
| **Southeastern Bible College** |
| **Southern Community College** |
| **Spring Hill College** |
| **Stillman College** |
| **Talladega College** |
| **The University of Alabama** |
| **Troy State University-Dothan Campus** |
| **Troy State University-Montgomery** |
| **TROY STATE UNIVERSITY-PHENIX CITY** |
| **Troy University** |
| **Tuskegee University** |
| **United States Sports Academy** |
| **University of Alabama at Birmingham** |
| **University of Alabama in Huntsville** |
| **University of Mobile** |
| **University of Montevallo** |
| **University of North Alabama** |
| **University of South Alabama** |
| **UNIVERSITY OF SOUTH ALABAMA-BALDWIN** |
| **University of West Alabama** |
| **AR** |
| **ABC Beauty College Inc** |
| **Academy of Salon and Spa** |
| **Arkansas Baptist College** |
| **Arkansas Beauty School-Little Rock** |
| **Arkansas College of Barbering and Hair Design** |
| **Arkansas Northeastern College** |
| **Arkansas State University Mid-South** |
| **Arkansas State University-Beebe** |
| **Arkansas State University-Main Campus** |
| **ARKANSAS STATE UNIVERSITY-SEARCY** |
| **Arkansas Tech University** |
| **ARKANSAS VALLEY TECHNICAL INSTITUTE** |
| **Arthur's Beauty College Inc-Fort Smith** |
| **Arthur's Beauty College Inc-Jacksonville** |
| **Baptist Health College-Little Rock** |
| **Bee Jays Academy** |
| **Black River Technical College** |
| **Blytheville Academy of Cosmetology** |
| **Career Academy of Hair Design** |
| **Central Baptist College** |
| **College of the Ouachitas** |
| **Cossatot Community College of the University of Arkansas** |
| **COTTON BOLL TECHNICAL INSTITUTE** |
| **Crowley's Ridge College** |
| **Crowley's Ridge Technical Institute** |
| **De Luxe Beauty School** |
| **DELTA TECHNICAL INSTITUTE** |
| **East Arkansas Community College** |
| **Eastern College of Health Vocations-Little Rock** |
| **FOREST ECHOES TECHNICAL INSTITUTE** |
| **GREAT RIVERS TECHNICAL INSTITUTE** |
| **Harding University** |
| **Henderson State University** |
| **Hendrix College** |
| **Hot Springs Beauty College** |
| **Imagine-Paul Mitchell Partner School** |
| **Jefferson Regional Medical Center School of Nursing** |
| **John Brown University** |
| **Lees School of Cosmetology** |
| **Lyon College** |
| **MARCEL-ROYALE BEAUTY ACADEMY** |
| **Marsha Kay Beauty College** |
| **National Park College** |
| **New Tyler Barber College Inc** |
| **North Arkansas College** |
| **NORTHWEST ARKANSAS COLLEGE OF COSMETOLOGY** |
| **Northwest Technical Institute** |
| **Ouachita Baptist University** |
| **Ozarka College** |
| **Paul Mitchell the School-Arkansas** |
| **Philander Smith College** |
| **Phillips Community College of the University of Arkansas** |
| **PROFESSIONAL BEAUTY COLLEGE INC** |
| **Professional Cosmetology Education Center** |
| **QUAPAW TECHNICAL INSTITUTE** |
| **REMINGTON COLLEGE** |
| **Searcy Beauty College** |
| **Shorter College** |
| **South Arkansas Community College** |
| **Southeast Arkansas College** |
| **Southern Arkansas University Main Campus** |
| **Southern Arkansas University Tech** |
| **University of Arkansas** |
| **University of Arkansas at Little Rock** |
| **University of Arkansas at Monticello** |
| **University of Arkansas at Pine Bluff** |
| **University of Arkansas Community College Rich Mountain** |
| **University of Arkansas Community College-Batesville** |
| **University of Arkansas Community College-Hope** |
| **University of Arkansas Community College-Morrilton** |
| **University of Arkansas for Medical Sciences** |
| **University of Arkansas-Fort Smith** |
| **University of Arkansas-Pulaski Technical College** |
| **University of Central Arkansas** |
| **University of the Ozarks** |
| **Williams Baptist College** |
| **AZ** |
| **American Indian College Inc** |
| **AMERICAN INSTITUTE** |
| **American Institute of Trucking** |
| **Anthem College-Phoenix** |
| **Arizona Academy of Beauty-East** |
| **Arizona Automotive Institute** |
| **ARIZONA BIBLE COLLEGE** |
| **Arizona Christian University** |
| **Arizona State University-Tempe** |
| **Arizona Western College** |
| **Avalon School of Cosmetology-Mesa** |
| **Brillare Hairdressing Academy** |
| **Brookline College-Phoenix** |
| **Brown Mackie College-Tucson** |
| **Bryan University** |
| **Carrington College-Mesa** |
| **Carrington College-Phoenix North** |
| **Carrington College-Tucson** |
| **Central Arizona College** |
| **Charles of Italy Beauty College** |
| **Cochise County Community College District** |
| **CollegeAmerica-Flagstaff** |
| **Collins College** |
| **Cortiva Institute-Scottsdale** |
| **Cortiva Institute-Tucson** |
| **DeVoe College of Beauty** |
| **DeVry University-Arizona** |
| **Dine College** |
| **Eastern Arizona College** |
| **Empire Beauty School-Chandler** |
| **Empire Beauty School-Flagstaff** |
| **Empire Beauty School-Glendale** |
| **Empire Beauty School-NW Phoenix** |
| **Empire Beauty School-Paradise Valley** |
| **Empire Beauty School-Tucson** |
| **GateWay Community College** |
| **Glendale Community College** |
| **Grand Canyon University** |
| **ITT Technical Institute-Tempe** |
| **ITT Technical Institute-Tucson** |
| **Kaplan College-Phoenix** |
| **Lamson College** |
| **Long Technical College-East Valley** |
| **Maricopa Beauty College LLC** |
| **Mesa Community College** |
| **Metropolitan College** |
| **Mohave Community College** |
| **Mundus Institute** |
| **Northern Arizona University** |
| **Northland Pioneer College** |
| **Olympian Academy of Cosmetology** |
| **Ottawa University-Phoenix** |
| **PARKS COLLEGE** |
| **Phoenix College** |
| **Pima Community College** |
| **Pima Medical Institute-Tucson** |
| **Prescott College** |
| **Refrigeration School Inc** |
| **Rio Salado College** |
| **Roberto-Venn School of Luthiery** |
| **Scottsdale Community College** |
| **South Mountain Community College** |
| **Southwest University of Visual Arts-Tucson** |
| **Thunderbird School of Global Management** |
| **Tucson College** |
| **Universal Technical Institute of Arizona Inc** |
| **Universal Technical Institute of Arizona Inc-Motorcycle Mechanics Institute Division** |
| **University of Arizona** |
| **University of Phoenix-Phoenix Campus** |
| **Western International University** |
| **Yavapai College** |
| **CA** |
| **Academy of Art University** |
| **Academy of Professional Careers** |
| **Academy Pacific Travel College** |
| **Allan Hancock College** |
| **Alliant International University** |
| **Alliant International University-San Diego** |
| **American Academy of Dramatic Arts-Los Angeles** |
| **American Baptist Seminary of the West** |
| **American Beauty College** |
| **American Career College-Los Angeles** |
| **American Conservatory Theater** |
| **American Film Institute Conservatory** |
| **American InterContinental University** |
| **American River College** |
| **Antelope Valley College** |
| **Art Center College of Design** |
| **Associated Technical College** |
| **Associated Technical College-Los Angeles** |
| **Associated Technical College-San Diego** |
| **Avalon School of Cosmetology-Alameda** |
| **Azusa Pacific University** |
| **Bakersfield College** |
| **Barstow Community College** |
| **Bellus Academy-National City** |
| **Bethany University** |
| **Biola University** |
| **BJORNS HAIRSTYLING ACADEMY** |
| **Brooks College** |
| **Brooks Institute** |
| **Brownson Technical School** |
| **Butte College** |
| **Cabrillo College** |
| **California Baptist University** |
| **California Beauty School** |
| **CALIFORNIA BUSINESS INSTITUTE** |
| **California Christian College** |
| **CALIFORNIA COLLEGE OF PODIATRIC MEDICINE** |
| **California College of the Arts** |
| **California College San Diego** |
| **California Hair Design Academy** |
| **California Institute of Integral Studies** |
| **California Institute of Technology** |
| **California Institute of the Arts** |
| **California Lutheran University** |
| **CALIFORNIA PARAMEDICAL AND TECHNICAL COLLEGE** |
| **California Polytechnic State University-San Luis Obispo** |
| **California State Polytechnic University-Pomona** |
| **California State University Maritime Academy** |
| **California State University-Bakersfield** |
| **California State University-Chico** |
| **California State University-Dominguez Hills** |
| **California State University-East Bay** |
| **California State University-Fresno** |
| **California State University-Fullerton** |
| **California State University-Long Beach** |
| **California State University-Los Angeles** |
| **California State University-Northridge** |
| **California State University-Sacramento** |
| **California State University-San Bernardino** |
| **California State University-Stanislaus** |
| **California Western School of Law** |
| **Canada College** |
| **Career Academy of Beauty** |
| **Casa Loma College-Van Nuys** |
| **Cerritos College** |
| **Cerro Coso Community College** |
| **CET-Colton** |
| **CET-El Centro** |
| **CET-Gilroy** |
| **CET-Salinas** |
| **CET-San Diego** |
| **CET-San Jose** |
| **CET-Watsonville** |
| **Chabot College** |
| **Chaffey College** |
| **Chapman University** |
| **Charles R Drew University of Medicine and Science** |
| **Church Divinity School of the Pacific** |
| **Citrus College** |
| **City College of San Francisco** |
| **Claremont Graduate University** |
| **Claremont McKenna College** |
| **Cleveland Chiropractic College of Los Angeles** |
| **Clovis Adult Education** |
| **Coastline Community College** |
| **Coba Academy** |
| **Cogswell College** |
| **Coleman University** |
| **College of Alameda** |
| **College of the Canyons** |
| **Columbia College** |
| **Columbia College Hollywood** |
| **Concordia University-Irvine** |
| **Everest College-Hayward** |
| **ITT Technical Institute-Rancho Cordova** |
| **Le Cordon Bleu College of Culinary Arts-San Francisco** |
| **Milan Institute-Visalia** |
| **National Polytechnic College of Science** |
| **Phillips Graduate University** |
| **San Diego Christian College** |
| **Sofia University** |
| **The Academy of Radio and TV Broadcasting** |
| **University of California-Berkeley** |
| **University of California-Davis** |
| **University of California-Hastings College of Law** |
| **University of California-Irvine** |
| **University of California-Los Angeles** |
| **University of California-Riverside** |
| **University of California-San Diego** |
| **University of California-San Francisco** |
| **University of California-Santa Barbara** |
| **University of California-Santa Cruz** |
| **Western University of Health Sciences** |
| **IL** |
| **Prince Institute-Southeast** |
| **NM** |
| **Pima Medical Institute-Albuquerque** |
| **TN** |
| **Harding University Graduate School of Religion** |
| **SOUTHERN INSTITUTE OF COSMETOLOGY** |
| **WA** |
| **Charter College** |
| **Grand Total** |
| **Row Labels** |

Here I used pivot table to identify the universities at particular locations:

Such as Berkeley, San francisco with its ID, and percentage of students admitted.

STUDENTS ADMITTED IN THE STATE OF BERKELEY.

|  |  |  |  |
| --- | --- | --- | --- |
| **Row Labels** | **UNIVTID** | **OPEID6** | **Percentage of Stud Adm-%** |
| **American Baptist Seminary of the West** | **108861** | **1120** |  |
| **Berkeley** | **108861** | **1120** | **83** |
| CA | 108861 | 1120 |  |
| **Church Divinity School of the Pacific** | **112127** | **1165** |  |
| **Berkeley** | **112127** | **1165** | **76** |
| CA | 112127 | 1165 |  |
| **University of California-Berkeley** | **110635** | **1312** |  |
| **Berkeley** | **110635** | **1312** | **84** |
| CA | 110635 | 1312 |  |

STUDENTS ADMITTED IN THE STATE OF SANFRANCISCO.

|  |  |
| --- | --- |
| **Row Labels** | **Sum of Percentage of Stud Adm-%** |
| **112700** | **58** |
| **California College of the Arts** |  |
| San Francisco |  |
| CA |  |
| **131900** | **91** |
| **University of California-San Francisco** |  |
| San Francisco |  |
| CA |  |
| **394700** | **71** |
| **University of California-Hastings College of Law** |  |
| San Francisco |  |
| CA |  |
| **450201** | **76** |
| **City College of San Francisco** | **76** |
| San Francisco |  |
| CA |  |
| **753100** | **68** |
| **Academy of Art University** | **68** |
| San Francisco |  |
| CA |  |
| **1188100** | **70** |
| **Alliant International University** | **70** |
| San Francisco |  |
| CA |  |
| **1215400** |  |
| **California Institute of Integral Studies** | **64** |
| San Francisco |  |
| CA |  |
| **2099200** |  |
| **American Conservatory Theater** | **52** |
| San Francisco |  |
| CA |  |
| **2220200** |  |
| **Le Cordon Bleu College of Culinary Arts-San Francisco** | **95** |
| San Francisco |  |
| CA |  |
|  |  |

1. Descriptive Statistics:
2. STANDARDIZED DATA:

The standard deviation is an important measure of variability because of its many roles in statistics.

DESCRIPTIVE STATISTICS FOR STUDENTS ADMITTED AT EACH UNIVERSITY AND THE AVAILABLE VACANCY SEATS AT UNITED STATES UNIVERSITIES:

|  |  |  |  |
| --- | --- | --- | --- |
| *NUM STD ADMITTED PER UNIV* |  | *VACANCY SEATS AVA PER UNIV* |  |
|  |  |  |  |
| Mean | 1868.556818 | Mean | 619.6051136 |
| Standard Error | 22.06218051 | Standard Error | 19.57398893 |
| Median | 1839 | Median | 601.5 |
| Mode | 1228 | Mode | 0 |
| Standard Deviation | 413.9231966 | Standard Deviation | 367.2405847 |
| Sample Variance | 171332.4127 | Sample Variance | 134865.647 |
| Kurtosis | -0.511659978 | Kurtosis | -0.912368756 |
| Skewness | 0.257799001 | Skewness | 0.22581972 |
| Range | 1962 | Range | 1470 |
| Minimum | 1000 | Minimum | 0 |
| Maximum | 2962 | Maximum | 1470 |
| Sum | 657732 | Sum | 218101 |
| Count | 352 | Count | 352 |
| Confidence Level(95.0%) | 43.39069558 | Confidence Level(95.0%) | 38.49705584 |

DOT PLOT FOR NUMBER OF COLLEGES IN EACH STATE:

Hear I used pivot plot to identify the number of colleges in each state at US. The dot plot tell us the variability between the data set.

|  |  |
| --- | --- |
| NAME OF THE UNIVERISTIES IN | TOTAL NO. COLL |
| AK | 9 |
| AL | 74 |
| AR | 76 |
| CA | 113 |
| IL | 1 |
| NM | 1 |
| TN | 2 |
| WA | 1 |
| AZ | 71 |
|  |  |
| TOTAL | 348 |

VARIANCE AND STANDARD DEVIATION:

Here I used 25 sample data and 352 population to measure variance and standard deviation for students participation lab hours out of 10 points in each colleges.

|  |  |
| --- | --- |
| VAR(P=352) | 0.727207 |
| VAR(S=25) | 0.689067 |
| STD(P=352) | 0.876723 |
| STD(S=25) | 0.8301 |

Stephen’ Standard Deviation is:

|  |  |
| --- | --- |
| Sum | 523298 |
| mean | 1486.642 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sum | 30634184.9 | 808590994 |  |  |  | n-1 | 352-1 | 351 |
|  |  |  |  |  |  | sqrt | 87276.88005 | 295.427 |

S= 295.427

|  |
| --- |
| Mean = 1486.642 |

Coefficient of Variation:

To compare dispersion in data sets with dissimilar units of measurement (e.g., kilograms and ounces) or dissimilar means (e.g., home prices in two different cities), we define the coefficient of variation (CV), which is a unit-free measure of dispersion.

The CV is the standard deviation expressed as a percent of the mean. In some data sets, the standard deviation can actually exceed the mean, so the CV can exceed 100 percent.

CV = 100\*s/mean of x

CV=100\* 295.427/1486.642= 19.88%

Standardized Data:

A general approach to identifying unusual observations is to redefine each observation in terms of its distance from the mean in standard deviations to obtain standardized data. We get the standardized value (called a z-score) by transforming each value of the observed data:

zi = xi - μ / σ for a population.

zi = xi – mean of x/s for a sample.

Here I used students scholarship amount to determine z-score value.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scholarship Amt in $ | |  | x-mean | square(x-mean) | square of x | standardize data-z score |
| 1001 |  |  | -485.642 | 235848.1522 | 1002001 | -1.643866985 |
| 1007 | sum | 523298 | -479.642 | 230056.4482 | 1014049 | -1.623557372 |
| 1012 | mean | 1486.642 | -474.642 | 225285.0282 | 1024144 | -1.606632695 |
| 1013 | std dev | 295.4266 | -473.642 | 224336.7442 | 1026169 | -1.603247759 |
| 1014 | std dev-s | 295.4266 | -472.642 | 223390.4602 | 1028196 | -1.599862824 |
| 1014 |  |  | -472.642 | 223390.4602 | 1028196 | -1.599862824 |
| 1016 |  |  | -470.642 | 221503.8922 | 1032256 | -1.593092953 |
| 1020 |  |  | -466.642 | 217754.7562 | 1040400 | -1.579553211 |
| 1022 |  |  | -464.642 | 215892.1882 | 1044484 | -1.57278334 |
| 1026 |  |  | -460.642 | 212191.0522 | 1052676 | -1.559243598 |
| 1027 |  |  | -459.642 | 211270.7682 | 1054729 | -1.555858663 |
| 1028 |  |  | -458.642 | 210352.4842 | 1056784 | -1.552473727 |
| 1028 |  |  | -458.642 | 210352.4842 | 1056784 | -1.552473727 |
| 1029 |  |  | -457.642 | 209436.2002 | 1058841 | -1.549088792 |
| 1029 |  |  | -457.642 | 209436.2002 | 1058841 | -1.549088792 |
| 1030 |  |  | -456.642 | 208521.9162 | 1060900 | -1.545703856 |
| 1031 |  |  | -455.642 | 207609.6322 | 1062961 | -1.542318921 |
| 1032 |  |  | -454.642 | 206699.3482 | 1065024 | -1.538933985 |
| 1033 |  |  | -453.642 | 205791.0642 | 1067089 | -1.53554905 |
| 1038 |  |  | -448.642 | 201279.6442 | 1077444 | -1.518624372 |
| 1039 |  |  | -447.642 | 200383.3602 | 1079521 | -1.515239437 |
| 1040 |  |  | -446.642 | 199489.0762 | 1081600 | -1.511854501 |
| 1042 |  |  | -444.642 | 197706.5082 | 1085764 | -1.505084631 |
| 1047 |  |  | -439.642 | 193285.0882 | 1096209 | -1.488159953 |
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| 1791 |  |  | 304.358 | 92633.79216 | 3207681 | 1.030232036 |
| 1791 |  |  | 304.358 | 92633.79216 | 3207681 | 1.030232036 |
| 1793 |  |  | 306.358 | 93855.22416 | 3214849 | 1.037001906 |
| 1793 |  |  | 306.358 | 93855.22416 | 3214849 | 1.037001906 |
| 1794 |  |  | 307.358 | 94468.94016 | 3218436 | 1.040386842 |
| 1795 |  |  | 308.358 | 95084.65616 | 3222025 | 1.043771777 |
| 1798 |  |  | 311.358 | 96943.80416 | 3232804 | 1.053926584 |
| 1800 |  |  | 313.358 | 98193.23616 | 3240000 | 1.060696455 |
| 1806 |  |  | 319.358 | 101989.5322 | 3261636 | 1.081006068 |
| 1808 |  |  | 321.358 | 103270.9642 | 3268864 | 1.087775938 |
| 1808 |  |  | 321.358 | 103270.9642 | 3268864 | 1.087775938 |
| 1809 |  |  | 322.358 | 103914.6802 | 3272481 | 1.091160874 |
| 1810 |  |  | 323.358 | 104560.3962 | 3276100 | 1.094545809 |
| 1814 |  |  | 327.358 | 107163.2602 | 3290596 | 1.108085551 |
| 1815 |  |  | 328.358 | 107818.9762 | 3294225 | 1.111470487 |
| 1815 |  |  | 328.358 | 107818.9762 | 3294225 | 1.111470487 |
| 1821 |  |  | 334.358 | 111795.2722 | 3316041 | 1.1317801 |
| 1826 |  |  | 339.358 | 115163.8522 | 3334276 | 1.148704777 |
| 1828 |  |  | 341.358 | 116525.2842 | 3341584 | 1.155474648 |
| 1829 |  |  | 342.358 | 117209.0002 | 3345241 | 1.158859583 |
| 1831 |  |  | 344.358 | 118582.4322 | 3352561 | 1.165629454 |
| 1832 |  |  | 345.358 | 119272.1482 | 3356224 | 1.16901439 |
| 1836 |  |  | 349.358 | 122051.0122 | 3370896 | 1.182554132 |
| 1836 |  |  | 349.358 | 122051.0122 | 3370896 | 1.182554132 |
| 1845 |  |  | 358.358 | 128420.4562 | 3404025 | 1.213018551 |
| 1847 |  |  | 360.358 | 129857.8882 | 3411409 | 1.219788422 |
| 1848 |  |  | 361.358 | 130579.6042 | 3415104 | 1.223173357 |
| 1851 |  |  | 364.358 | 132756.7522 | 3426201 | 1.233328164 |
| 1853 |  |  | 366.358 | 134218.1842 | 3433609 | 1.240098035 |
| 1855 |  |  | 368.358 | 135687.6162 | 3441025 | 1.246867906 |
| 1857 |  |  | 370.358 | 137165.0482 | 3448449 | 1.253637776 |
| 1858 |  |  | 371.358 | 137906.7642 | 3452164 | 1.257022712 |
| 1860 |  |  | 373.358 | 139396.1962 | 3459600 | 1.263792583 |
| 1861 |  |  | 374.358 | 140143.9122 | 3463321 | 1.267177518 |
| 1862 |  |  | 375.358 | 140893.6282 | 3467044 | 1.270562454 |
| 1864 |  |  | 377.358 | 142399.0602 | 3474496 | 1.277332325 |
| 1866 |  |  | 379.358 | 143912.4922 | 3481956 | 1.284102196 |
| 1867 |  |  | 380.358 | 144672.2082 | 3485689 | 1.287487131 |
| 1877 |  |  | 390.358 | 152379.3682 | 3523129 | 1.321336486 |
| 1877 |  |  | 390.358 | 152379.3682 | 3523129 | 1.321336486 |
| 1878 |  |  | 391.358 | 153161.0842 | 3526884 | 1.324721421 |
| 1880 |  |  | 393.358 | 154730.5162 | 3534400 | 1.331491292 |
| 1882 |  |  | 395.358 | 156307.9482 | 3541924 | 1.338261163 |
| 1883 |  |  | 396.358 | 157099.6642 | 3545689 | 1.341646099 |
| 1885 |  |  | 398.358 | 158689.0962 | 3553225 | 1.34841597 |
| 1888 |  |  | 401.358 | 161088.2442 | 3564544 | 1.358570776 |
| 1890 |  |  | 403.358 | 162697.6762 | 3572100 | 1.365340647 |
| 1891 |  |  | 404.358 | 163505.3922 | 3575881 | 1.368725582 |
| 1894 |  |  | 407.358 | 165940.5402 | 3587236 | 1.378880389 |
| 1903 |  |  | 416.358 | 173353.9842 | 3621409 | 1.409344808 |
| 1904 |  |  | 417.358 | 174187.7002 | 3625216 | 1.412729743 |
| 1905 |  |  | 418.358 | 175023.4162 | 3629025 | 1.416114679 |
| 1905 |  |  | 418.358 | 175023.4162 | 3629025 | 1.416114679 |
| 1911 |  |  | 424.358 | 180079.7122 | 3651921 | 1.436424292 |
| 1912 |  |  | 425.358 | 180929.4282 | 3655744 | 1.439809227 |
| 1916 |  |  | 429.358 | 184348.2922 | 3671056 | 1.453348969 |
| 1919 |  |  | 432.358 | 186933.4402 | 3682561 | 1.463503775 |
| 1920 |  |  | 433.358 | 187799.1562 | 3686400 | 1.466888711 |
| 1924 |  |  | 437.358 | 191282.0202 | 3701776 | 1.480428453 |
| 1930 |  |  | 443.358 | 196566.3162 | 3724900 | 1.500738066 |
| 1931 |  |  | 444.358 | 197454.0322 | 3728761 | 1.504123001 |
| 1936 |  |  | 449.358 | 201922.6122 | 3748096 | 1.521047678 |
| 1938 |  |  | 451.358 | 203724.0442 | 3755844 | 1.527817549 |
| 1939 |  |  | 452.358 | 204627.7602 | 3759721 | 1.531202485 |
| 1947 |  |  | 460.358 | 211929.4882 | 3790809 | 1.558281969 |
| 1951 |  |  | 464.358 | 215628.3522 | 3806401 | 1.57182171 |
| 1952 |  |  | 465.358 | 216558.0682 | 3810304 | 1.575206646 |
| 1964 |  |  | 477.358 | 227870.6602 | 3857296 | 1.615825872 |
| 1964 |  |  | 477.358 | 227870.6602 | 3857296 | 1.615825872 |
| 1967 |  |  | 480.358 | 230743.8082 | 3869089 | 1.625980678 |
| 1977 |  |  | 490.358 | 240450.9682 | 3908529 | 1.659830033 |
| 1980 |  |  | 493.358 | 243402.1162 | 3920400 | 1.669984839 |
| 1981 |  |  | 494.358 | 244389.8322 | 3924361 | 1.673369775 |
| 1982 |  |  | 495.358 | 245379.5482 | 3928324 | 1.67675471 |
| 1982 |  |  | 495.358 | 245379.5482 | 3928324 | 1.67675471 |
| 1985 |  |  | 498.358 | 248360.6962 | 3940225 | 1.686909516 |
| 1988 |  |  | 501.358 | 251359.8442 | 3952144 | 1.697064323 |
| 1999 |  |  | 512.358 | 262510.7202 | 3996001 | 1.734298613 |

Unusual Observations:

Based on its standardized z-score, a data value is classified as:

Unusual if

MOD z i > 2 (beyond μ + or - 2σ) Outlier if u

MOD z i > 3 (beyond μ + or - 3σ)

From this z-score value there is no any outlier.

1. Percentiles, Quartile, and box plots:

Percentile score will tell us where we stand in comparison with others.

For example, if you are in the 83rd percentile, then 83 percent of the test-takers scored below you, and you are in the

|  |  |  |  |
| --- | --- | --- | --- |
| Term Fees: |  |  |  |
| Mean(Average) |  | 6494.634 |  |
| Meadian |  | 6512 |  |
| Mode |  | 6048 |  |
| Q1 |  | 6267 |  |
| Q2 |  | 6512 |  |
| Q3 |  | 6728.5 |  |
| Max |  | 6999 |  |
| Min |  | 6000 |  |
| N |  | 352 |  |
| Midhinge |  | Q1+Q2/2 | 9523 |
|  |  |  |  |
|  |  |  |  |
| 6512<9523 | Skewed Left |  |  |
| Second Quartile is Median. |  |  |  |

The first and third quartiles Q1 and Q3 indicate center because they define the boundaries for the middle 50 percent of the data. But Q1 and Q3 also indicate variability because the interquartile range Q3 – Q1 (denoted IQR) measures the degree of spread in the data (the middle 50 percent).

A box plot shows center (position of the median Q2). A box plot shows variability (width of the “box” defined by Q1 and Q3 and the range between xmin and xmax). A box plot shows shape (skewness if the whiskers are of unequal length and/or if the median is not in the center of the box).

1. Correlation and covariance.

The sample correlation coefficient is a well-known statistic that describes the degree of linearity between paired observations on two quantitative variables X and Y. The data set consists of n pairs (xi, yi) that are usually displayed on a scatter plot.

Its range is -1 <= r <= +1. When r is near 0 there is little or no linear relationship between X and Y. An r value near +1 indicates a strong positive relationship, while an r value near

-1 indicates a strong negative relationship.

Excel’s formula =CORREL(X Data, Y Data) will return the sample correlation coefficient for two columns (or rows) of paired data.

To estimate the covariance, we would generally use the sample formula:

Covariance The covariance of two random variables X and Y is denoted Cov(X,Y) or simply σXY. The covariance measures the degree to which the values of X and Y change together.

Correlation:

|  |  |
| --- | --- |
|  | *Total Seats Available Per University* |
| Column 1 | 1 |

Covariance:

|  |  |
| --- | --- |
|  | *Total Seats Available Per University* |
|  | 79353.11 |

Covariance with 2 variables (vacancy seats available per university, Total seats available per university)

|  |  |  |
| --- | --- | --- |
|  | VACANCY SEATS AVA PER UNIV | TOTAL SEATS AVA PER UNIV |
| Column 1 | 134482.5 |  |
| Column 2 | 21494.97 | 79353.11 |

Coefficient:

|  |  |  |
| --- | --- | --- |
|  | VACANCY SEATS AVA PER UNIV | TOTAL SEATS AVA PER UNIV |
| VACANCY SEATS AVA PER UNIV | 1 |  |
| TOTAL SEATS AVA PER UNIV | 0.208076 | 1 |

Applying the formula for a sample correlation coefficient:

|  |  |  |
| --- | --- | --- |
| CORRELATION | 0.208075996 | BT. 2 VARIABLES(Xdata,ydata) |
| COVARIANCE | -113309.4376 | BT. 2 VARIABLES(Xdata,ydata) |
| STDIV(X DATA) | 367.2405847 |  |
| STD(Y DATA) | 282.0978279 |  |
| COUNT(X DATA) | 352 |  |

|  |
| --- |
|  |
|  |

r = sXY / s XsY ; r = -87039.3

COVARIANCE BETWENN 2 VARIABLES OF ON CAMPUS JOB WRKING HOURS WITH ON CAMPUS SALARY IN $;

Here I want to correlate when working hours increase that time the salary also will increase.

|  |  |  |
| --- | --- | --- |
|  | ON CAMPUS JOB WRK HRS | ON CAMPUS SALARY IN $ |
| ON CAMPUS JOB WRK HRS | 108.9666318 |  |
| ON CAMPUS SALARY IN $ | 1852.43274 | 31491.35658 |
|  |  |  |

THE DEGREE OF LINEARINTY BETWEEN PAIRED OBSERVATIONS:

1. Skewness and kurtosis:

Skewness In a general way, skewness may be judged by looking at the sample histogram, or by comparing the mean and median.

Kurtosis Kurtosis refers to the relative length of the tails and the degree of concentration in the center.

TOP 10 PERCNTAGE IN CA SATAE UNIVERSITIES :

PERCENTAGE OF SUTENTS ADMITTED, UNIVERSITY NAME, NUMBER OF STUDENTS ADMITTED, AND TUITION FEES.

|  |  |
| --- | --- |
| **Row Labels** | **Count of STABBR** |
| **CA** |  |
| **59** | **4** |
| Brownson Technical School |  |
| **1228** |  |
| 6153 |  |
| California Hair Design Academy |  |
| **1228** |  |
| 6772 |  |
| College of Alameda |  |
| **1622** |  |
| 6694 |  |
| San Diego Christian College |  |
| **1755** |  |
| 6404 |  |
| **68** | **4** |
| Academy of Art University |  |
| **1778** |  |
| 6316 |  |
| American InterContinental University |  |
| **1474** |  |
| 6218 |  |
| Cogswell College |  |
| **1701** |  |
| 6176 |  |
| Western University of Health Sciences |  |
| **1804** |  |
| 6945 |  |
| **72** | **6** |
| Alliant International University-San Diego |  |
| **1625** |  |
| 6240 |  |
| Antelope Valley College |  |
| **2007** |  |
| 6317 |  |
| Azusa Pacific University |  |
| **1492** |  |
| 6352 |  |
| CET-Gilroy |  |
| **1836** |  |
| 6126 |  |
| Clovis Adult Education |  |
| **1809** |  |
| 6004 |  |
| Sofia University |  |
| **1547** |  |
| 6588 |  |
| **74** | **4** |
| California State University-Los Angeles |  |
| **1551** |  |
| 6264 |  |
| Chapman University |  |
| **1902** |  |
| 6491 |  |
| Milan Institute-Visalia |  |
| **1863** |  |
| 6404 |  |
| University of California-Santa Barbara |  |
| **2048** |  |
| 6608 |  |
| **75** | **5** |
| American Beauty College |  |
| **1610** |  |
| 6501 |  |
| Brooks College |  |
| **1689** |  |
| 6792 |  |
| California State University-Northridge |  |
| **1990** |  |
| 6733 |  |
| Canada College |  |
| **2122** |  |
| 6257 |  |
| Concordia University-Irvine |  |
| **1789** |  |
| 6898 |  |
| **83** | **5** |
| American Baptist Seminary of the West |  |
| **2091** |  |
| 6066 |  |
| CET-Watsonville |  |
| **1735** |  |
| 6531 |  |
| Columbia College |  |
| **1711** |  |
| 6269 |  |
| Phillips Graduate University |  |
| **2102** |  |
| 6472 |  |
| University of California-Davis |  |
| **1684** |  |
| 6714 |  |
| **85** | **4** |
| American River College |  |
| **2347** |  |
| 6742 |  |
| CALIFORNIA BUSINESS INSTITUTE |  |
| **1905** |  |
| 6491 |  |
| Career Academy of Beauty |  |
| **1739** |  |
| 6296 |  |
| College of the Canyons |  |
| **2188** |  |
| 6563 |  |
| **86** | **4** |
| CET-Colton |  |
| **2247** |  |
| 6867 |  |
| CET-San Jose |  |
| **2032** |  |
| 6282 |  |
| Cleveland Chiropractic College of Los Angeles |  |
| **2424** |  |
| 6520 |  |
| ITT Technical Institute-Rancho Cordova |  |
| **1823** |  |
| 6819 |  |
| **88** | **5** |
| Bellus Academy-National City |  |
| **2078** |  |
| 6989 |  |
| California Baptist University |  |
| **1828** |  |
| 6686 |  |
| CALIFORNIA PARAMEDICAL AND TECHNICAL COLLEGE |  |
| **1925** |  |
| 6018 |  |
| Cerro Coso Community College |  |
| **2528** |  |
| 6682 |  |
| Coba Academy |  |
| **2325** |  |
| 6409 |  |
| **91** | **4** |
| Cabrillo College |  |
| **2252** |  |
| 6192 |  |
| California State University-Sacramento |  |
| **2372** |  |
| 6769 |  |
| California Western School of Law |  |
| **2617** |  |
| 6485 |  |
| University of California-San Francisco |  |
| **2404** |  |
| 6492 |  |

TOTAL 45 COLLEGES

1. Probability:
2. Random Experiments:

A random experiment is an observational process whose results cannot be known in advance. For example, when a customer enters a Lexus dealership, will the customer buy a car or not? How much will the customer spend?

The set of all possible outcomes (denoted S) is the sample space for the experiment. Some sample spaces can be enumerated easily, while others may be immense or impossible to enumerate.

For example, when C itiBank makes a consumer loan, we might define a sample space with only two outcomes: S 5 {default, no default} The sample space describing a Walmart customer’s payment method might have four outcomes: S 5 {cash, debit card, credit card, check}

1. Probability.

The probability of an event is a number that measures the relative likelihood that the event will occur. The probability of an event A, denoted P(A), must lie within the interval from 0 to 1:

0 <= P(A) <= 1

P(A) 5 0 means the event cannot occur (e.g., a naturalized citizen becoming president of the United States) while P(A) 5 1 means the event is certain to occur (e.g., rain occurring in Hilo, Hawaii, sometime this year).

1. Discrete Probability Distribution:
2. Uniform Distribution:

A probability distribution can be described either by its probability density function (PDF) or by its cumulative distribution function (CDF).

The uniform continuous distribution is perhaps the simplest model one can imagine. If X is a random variable that is uniformly distributed between a and b.

Since the PDF is rectangular, you can easily verify that the area under the curve is 1 by multiplying its base (b 2 a) by its height 1y(b 2 a)

The uniform distribution can be useful in business for what if analysis, in situations where you know the “worst” and “best” range.

1. Two Sample Hypothesis Test:

The logic of two-sample tests is based on the fact that two samples drawn from the same population may yield different estimates of a parameter due to chance. For example, exhaust emission tests could yield different results for two vehicles of the same type.

1. Comparing Two Means – independent samples.

Paired Data When sample data consist of n matched pairs, a different approach is required. If the same individuals are observed twice but under different circumstances, we have a paired comparison. For example:

Here I used two pair of samples of the students at same university but different circumstances like day scholar students after getting accommodation at the university campus for the same students.

|  |  |  |
| --- | --- | --- |
| t-Test: Paired Two Sample for Means | |  |
|  |  |  |
|  | *TUITION FEES in $(ALL STD)* | *TERM FEES(HOSTEL STD)* |
| Mean | 6494.633523 | 6840.178977 |
| Variance | 79824.25563 | 197582.21 |
| Observations | 352 | 352 |
| Pearson Correlation | 0.682652286 |  |
| Hypothesized Mean Difference | 0 |  |
| df | 351 |  |
| t Stat | -19.91772907 |  |
| P(T<=t) one-tail | 6.68519E-60 |  |
| t Critical one-tail | 1.6492064 |  |
| P(T<=t) two-tail | 1.33704E-59 |  |
| t Critical two-tail | 1.966745561 |  |

1. Confidence Interval for Two Proportions:

|  |  |  |
| --- | --- | --- |
| INSTNM | STABBR | Scholarship Amt in $ |
| California Christian College | CA | 1059 |
| Casa Loma College-Van Nuys | CA | 1026 |
| CET-Salinas | CA | 1038 |
| BJORNS HAIRSTYLING ACADEMY | CA | 1042 |
| Alliant International University-San Diego | CA | 1029 |
| Chabot College | CA | 1070 |
| Academy of Art University | CA | 1082 |
| University of California-Hastings College of Law | CA | 1084 |
| CET-San Diego | CA | 1012 |
| Phillips Graduate University | CA | 1054 |
| Chapman University | CA | 1061 |
| CET-Watsonville | CA | 1072 |
| University of California-Santa Barbara | CA | 1047 |
| Citrus College | CA | 1016 |
| College of Alameda | CA | 1070 |
| Allan Hancock College | CA | 1055 |
| Bellus Academy-National City | CA | 1014 |

|  |  |  |
| --- | --- | --- |
| Clovis Adult Education | CA | 1183 |
| CALIFORNIA PARAMEDICAL AND TECHNICAL COLLEGE | CA | 1177 |
| University of California-San Diego | CA | 1104 |
| Butte College | CA | 1173 |
| Alliant International University | CA | 1103 |
| Antelope Valley College | CA | 1158 |
| California College San Diego | CA | 1106 |
| California State University-Long Beach | CA | 1111 |
| Cerro Coso Community College | CA | 1200 |
| University of California-Davis | CA | 1135 |
| The Academy of Radio and TV Broadcasting | CA | 1124 |
| Columbia College Hollywood | CA | 1104 |
| Biola University | CA | 1172 |
| California State University-San Bernardino | CA | 1195 |

NUMBER OF UNIVERSITIES IN THE GROUP = 352(n).

Usual care of universities selected randomly from the data set:

X1 =14

P1 = x1/n -> 14/352 = 0.039773

NUMBER OF UNIVERSITIES IN THE GROUP = 352(n).

Extra care of universities selected randomly from the data set:

X2 =17

P2 = x2/n -> 17/352 = 0.048295455

(p1 - p2) + or – zα/2 √ p1(1- p1) /n + p2(1 - p2)/ n 2

zα/2 = 1.960

0.000239+or -0.000958

1. Comparing Two Variance.
2. Analysis For Variance:
3. Multiple Comparisons.

Tukey’s studentized range test (sometimes called the HSD or “honestly significant difference” test). It has good power and is widely used. We will refer to it as Tukey’s Understand and perform Tukey’s test for paired means.

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test, named for statistician John Wilder Tukey (1915–2000).

The hypotheses to compare group j with group k are H0: μj 5 μk H1: μj Þ μk

Tukey’s test statistic is

Tcalc =| y j 2 − y k |/ √ MSE[1 -/nj + 1/ nk ]

We would reject H0 if Tcalc > Tc, n2c , where Tc,n2c is a critical value for the desired level of significance. Table 11.4 shows 5 percent critical values of Tc, n2c.

We take MSE directly from the ANOVA calculations (see Table 11.2). The MSE is the pooled variance for all c samples combined

1. Simple Regression:

The hypothesized relationship may be linear, quadratic, or some other form. For now we will focus on the simple linear model in

slope-intercept form:

Y = slope 3 X + y-intercept.

In statistics this straight-line model is often referred to as a simple regression equation. The slope and intercept of the simple regression equation are used to describe the relationship between the two variables. We define the Y variable as the response variable (the dependent variable) and the X variable as the predictor variable (the independent variable).

Prediction Using Regression:

One of the main uses of regression is to make predictions. Once we have a fitted regression equation that shows the estimated relationship between X (the independent variable) and Y (the dependent variable), we can plug in any value of X to obtain the prediction for Y. For example:

Rent 5 150 1 1.05 SqFt

The predicted rent on an 800-square-foot apartment is $990, that is,

Rent = 150 + 1.05 (800) = 990.

E (Y | x) = β0 + β1 x (simple regression equation)

y = b0 + b1 x (estimated regression equation)

Roman letters denote the coefficients b0 (the estimated intercept) and b1 (the estimated slope).

1. Regression Models.

When we propose a regression model, we might have a causal mechanism in mind, but cause and effect is not proven by a simple regression. We cannot assume that the explanatory variable is “causing” the variation we see in the response variable.

From the sample, we estimate the regression equation and use it to predict the expected value of Y for a given value of X:

Y hat = b0 + b1 x (estimated regression equation)

For a given value xi, the estimated value of the dependent variable is yi hat. The difference between the observed value yi and its estimated value yi hat is called a residual and is denoted ei .

|  |
| --- |
| Total number of degrees (HIGHDEG+PREDEG) per university for 352 universities. |

1. Confidence and Prediction Intervals.

The regression line is an estimate of the conditional mean of Y, that is, the expected value of Y for a given value of X, denoted E(Y | xi).

Yhat ±tα/2 Se

ILLUSTRATION STUDENT PRACTICAL HOURS AND LAB HOURS:

What is the relationship between the number of practical hours and the number of lab hours a university allocated for the students? We can estimate the regression line for these two variables using a sample of 352 universities.

The vertical line segment will show the difference between the actual and fitted participation scores (i.e. Residuals).

Fitted Slope: b 1 = SS xy / SS xx.

Fitted Intercept: b0 = mean of y- b1 mean of x.

From this data set can find each university’s expected lab score. Each prediction is a conditional mean, given the university’s lab hours.

From a scatter plot, we could visually estimate the slope and intercept.

1. Multiple Regression:
2. Multiple Regression.

Multiple regression extends simple regression to include several independent variables (called predictors). Multiple regression is required when a single-predictor model is inadequate to describe the true relationship between the dependent variable Y (the response variable) and its potential predictors (X1, X2, . . .).

Regression Terminology The response variable (Y) is assumed to be related to the k predictors (X1, X2, . . . , Xk ) by a linear equation called the population regression model: (13.1) y 5 β0 1 β1 x1 1 β2 x2 1 . . . 1 βk xk 1 ε A random error ε represents everything that is not part of the model. The unknown regression coefficients β0, β1, β2, . . ., βk are parameters and are denoted by Greek letters. Each coefficient βj shows the change in the expected value of Y for a unit change in Xj while holding everything else constant (ceteris paribus).

Here I calculated Y (tuition Fees) who has accommodation at the university. In my data set indicate as the students accommodation at the University 1= Yes, 0 = No.

Illustration: Tuition Fees:

Definition of Variable Short Name

Y Tuition Fees (thousands of dollars) Price

X1-Scolorship Amt in $(thousands of dollars) Price

X2-Percentage of Stud Adm-% Student Number in Percentage

X3-Accommodation (Yes=1, No=0) 0 and 1

X4- Accommodation Fees=10%(Tuit.Fe) Price

X5 - Health Insurance= 5%(Tuit.Fee) Price

|  |
| --- |
| Price (Tuition Fees) = β0 (LIB+COURSEF+OTHHER) + β1 Health Insurance + β2 Students Accommodation+ β3 EXAMINATION FEES (50%(T.F)+ ε. |

From my data set the value of n = 352.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUMMARY OUTPUT | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Regression Statistics* | |  |  |  |  |  |  |  |  |  | Y = CONSTANT+B1\*(X1)+B2\*(X2)+B3(X3)+B1(X4) | | | | |  | 5497.808 |
| Multiple R | 0.683419 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| R Square | 0.467061 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5497.808 |  |
| Adjusted R Square | 0.462467 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Standard Error | 325.8942 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 352 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |  |  |  |  |  |  |  |  |  |
| Regression | 3 | 32391309 | 10797103 | 101.6609 | 2.83E-47 |  |  |  |  | PREDICTED PER TERM: 2813,334.5,3163 | | | |  |  |  |  |
| Residual | 348 | 36960047 | 106207 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Total | 351 | 69351356 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |  |  |  |  |  |  |  |  |  |
| Intercept | -146.967 | 400.4957 | -0.36696 | 0.713871 | -934.663 | 640.73 | -934.663 | 640.73 |  |  |  |  |  |  |  |  |  |
| LIB+COURSEF+OTHHER | 36.50565 | 43.99489 | 0.82977 | 0.407238 | -50.0237 | 123.035 | -50.0237 | 123.035 |  |  |  |  |  |  |  |  |  |
| HEALTH INS | 3.423034 | 56.71786 | 0.060352 | 0.95191 | -108.13 | 114.976 | -108.13 | 114.976 |  |  |  |  |  |  |  |  |  |
| EXAMINATION FEES(50%(T.F) | -31.0435 | 39.38929 | -0.78812 | 0.431163 | -108.515 | 46.4275 | -108.515 | 46.4275 |  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
|  | We can use the fitted regression model to make predictions for various assumed predictor values. For example, what would be the expected tuition fees for the student if library cost of 2813,  with health insurance with 334.5 ,and examination fees 3163? In the fitted regression equation, we simply plug  PREDICTED PER TERM: 2813,334.5,3163  Y = CONSTANT+B1\*(X1)+B2\*(X2)+B3(X3)+B1(X4) |  |

|  |
| --- |
|  |

Y = -146.9665899+2813\*36.50565+334.5\*3.423034+3163\*-31.0435 = 5497.808

**CONCLUSION**

I analyzed my data by using bar chart, pie chart to describe the student’s salary. I used

descriptive analysis to determine the student’s information.

Although the students get scholarship amount to reduce their fee structure, they have to

work for other expenses for their education. To overcome from this issue, I created some

independent variable of on campus job, working hours, salary in dollar, etc.

In addition to this, I evaluated total number students admitted in each colleges, so

created some other variables called percentage of students admitted, total number seats allocated by

the US government, number of vacancy seats available etc..