

CS130 Practice Problems for the Final

Skills you will need:

Connect to Turing

Import data from the Web in Excel

Import Excel data into SPSS

Edit/cleanup data in Excel to prepare it for SPSS

Work through as many of the following problems as possible and save the results in a Word document. Some problems specify Excel or SPSS. If neither is specified you can choose.

Problem #1:

For a random number of selected homes sold in Washington County, the annual tax amount (in thousands of dollars) and selling price (in thousands of dollars) are as follows.

Taxes:	4.0	2.4	1.8	1.5	1.4	1.4	3.0	1.9
Selling								
Price:	265	142	114	160	130	150	228	145

Perform a Linear Regression on the above data using Excel and paste your results to a Word document.

Perform a Linear Regression on the above data using SPSS and paste your results to a Word document.

Using the equation editor, show the linear equation and R-squared value produced by performing the Linear Regression in SPSS.

For an annual tax amount of \$3,400, what might we expect the selling price of this house to be?

For a selling price of \$335,000, what might we expect the taxes to be for this house?

Problem #2:

Consider the following two cold medicines tested for acetaminophen.

Test the claim that the mean amount of acetaminophen is the same for both medicines. What is your conclusion?

Brand A	472	487	506	512	489	503	511	501	495	504	494	462
Brand B	562	512	523	528	554	513	516	510	524	510	524	508

In this problem, what is an observation (a row in SPSS)? What is measured for each observation? How many observations were made?

Explain what Hypothesis test you will be using to solve the problem.

State the Null Hypothesis.

Perform the proper Hypothesis test and paste in the results.

State your conclusion and reasoning for your conclusion.

Problem #3:

You have been hired at a water treatment plant to manage the water quality of the treated water. A new set of filters are installed and you want to determine if they were worth the money. You measure the bacteria count in treated water before and after the new filters are installed. The data you collected is shown below, two samples for each of the 11 clean water tanks.

In this problem, what is an observation (a row in SPSS)? What is measured for each observation? How many observations were made?

Did the new filter reduce the amount of bacteria in the clean water tanks in a statistically significant way?

Tank #	1	2	3	4	5	6	7	8	9	10	11
Old Filter	10	15	1	3	10	2	18	16	8	5	1
New Filter	4	10	2	1	7	1	3	5	2	3	2

Problem#4

It is often the case that bacterial cultures, confined to a petri dish, will grow quite rapidly until the amount of bacteria approaches a critical value. Given the formula for bacteria growth as $P(t) = 7.74e^{0.143t}$ where $P(t)$ is the amount of bacteria present at time t hours later. Create a worksheet that allows the user to input a time and that reports the amount of bacteria present at that particular time. Create a comment (right click on a cell and choose Insert Comment) that shows the number of bacteria that can be expected at time $t=1000$. The comment is to be placed and displayed in cell A5. Next, in a separate worksheet, create a table listing the size of the population at $t=0, t=5, t=10, \dots$ through $t=250$ (increase t by 5 each time). Finally, take the table data into SPSS and create an appropriate graph showing the results. Make sure the graph is completely and properly labeled.

Problem #5:

The NCAA is considering ways of speeding up the end of college basketball games. In a recent NCAA tournament, the last two minutes of 60 games took the following times to complete (in seconds):

756 587 929 871 378 503 564 1128 693 748
448 670 1023 335 540 853 852 495 666 474
443 325 514 404 820 915 793 778 627 483
861 337 292 1070 625 457 676 494 420 862
991 615 609 723 794 447 704 396 235 552
626 688 506 700 240 363 860 670 396 345

Note: Data was reported in USA Today

- a) In both Excel and SPSS, find the mean, median, mode, standard deviation, minimum, and maximum values for the given data. Paste these results into a Word document.
- b) Create a histogram of the given data.
- c) Do these times indicate that something should be done to speed up the last two minutes of the game (is the last two minutes too long)? Support your answer as best you can.

Problem #6:

You have been offered a 5 year loan on a \$10,000 car with an 8.7% annual interest rate. What will your monthly payment be?

You can afford a \$300 monthly payment. How does that affect the price of the car you can purchase using this same 5 year loan with an 8.7% interest rate?

Problem #7: Excel

Every month your parents probably receive a mortgage statement that shows their loan balance and some specifics about the loan like the monthly payment and monthly interest rate. They are not quite sure how many months they have left before the loan is paid off. You can develop a table that shows them the exact month that their loan is paid off. The ending balance might be a few cents (not exactly zero) but it should only be pennies off. Create an amortization table (a table showing how much you still owe on the loan. The table should contain, starting balance, monthly payment, interest charged (\$), and ending balance for each month) using the following information:

Loan Balance: 147,964.65
Monthly Payment: 1,580.17
Interest Rate: 6.5%

Do you have any way to check your results?

Problem #8: Excel

Create a new Excel Spreadsheet, name this worksheet **Box**. Most delivery companies charge a different price for different size boxes. ForestGroveShipping charges \$10.00 to deliver a small box and \$20.00 to deliver a large box. To determine if your box is small you need to add the length, width, and height of your box. If this total is less than 90 inches, the box is small. If it is 90 inches or more, the box is considered to be large.

You need to build a worksheet that will allow the user to input the length, width, and height of a box and have the cost to ship that box displayed in cell A4. Be sure to clearly label the input cells and the output cell. The output cell should either display \$10.00 or \$20.00. If the output is \$10.00, have cell A4 displayed in green. If the output is \$20.00, have cell A4 displayed in red.