ISU 580 Final Exam
Closed Book, Closed Notes, 2hrs max

Name _____

When asked to specify a "Study Design" please refer to the following list:
Ethnographic, Descriptive, Correlational, Demonstrative, Between-Subjects Experimental, Within-Subjects Experimental
You may modify these with the following prefixes:
Univariate, multivariate, N-factor, N-level (for integer N).

When asked what statistics you would use, be as specific as possible, e.g., "Mean and standard deviation of nose-picking frequency" or "One-way ANOVA on scream intensity with nose-twist and eye-poke devices as independent factors."

When asked "What kind of test is this?", choose from the following list:
t-test for independent means, t-test for dependent means, Chi-square goodness-of-fit, one-way ANOVA, multi-factor ANOVA, Pearson correlation

When asked for a "Research Model", draw a boxes and arrows diagram depicting variables and their relationships. Label the boxes with the role of the variable(s) contained (IV, DV, etc.) as well as the name(s) of the variable(s).

When asked to "Interpret the results" of a test, you should write the results in both English and publication format. Example: "There were no significant differences in performance between the Jacuzzi and Sauna groups, t(42)=5.67, n.s."

1. Descriptives, etc. For each of the following measures, check off all statistics that may be appropriate to use.

	Mean	Median	Mode	StdDev	Chi-square goodness of fit
1a. Decision whether to use a software package or not. _____					
1b. Time to perform a task. _____					
1c. Month of year _____					
1d. Percent error rate, given that the data has a positive skew					
1e. Likert scale (range 1-7)					

2. Power, etc. Fill in each of the cells in the following table with a) the conventional term for the situation (e.g., "Correct") AND b) the probability of this situation occurring (in terms of a symbol or formula, such as "α", "$\beta+\pi$" etc.).

"The Truth"

Your action

	H1 True	H1 False
Decide to Reject H0 & accept H1	2.1.a_____ 2.1.b_____	2.2.a_____ 2.2.b_____
Do not Reject H0 & do not accept H1	2.3.a_____ 2.3.b_____	2.4.a_____ 2.4.b_____

3. Study Designs. You want to compare the usability of two alternative prototype user interfaces for your new software product. You bring each participant into the lab and have him/her try each interface in sequence, while you measure their time to complete and precision (via number of errors) on a set of standard tasks.

3a. What kind of study design is this? _____

_____

3b. What statistics would you use?

_____

_____

_____

3c. Draw the research model.

4. Study Designs. You want to determine if there are any preferences among cell phone brands used by Northeastern students, so you survey 100 students, asking each which brand they own.

4a. What kind of study design is this? _____

_____

4b. What statistics would you use?

_____

_____

_____

4c. Draw the research model.

5. Study Designs. You want to determine the impact of music on the productivity of your phone tech support staff. You randomly assign each tech to receive either classic rock, country music or rap music piped into their phone headsets between calls, and also randomly assign each tech to receive their music at high or low volume.

5a. What kind of study design is this? _____

_____

5b. What statistics would you use?

_____

_____

_____

5c. Draw the research model.

6. Study Designs. You want to compare satisfaction with four different IM clients. You randomly assign participants to use one of the IM clients, conduct a 10 minute chat with the experimenter using the client, and then fill out a 5-item satisfaction questionnaire.

6a. What kind of study design is this? _____

_____

6b. What statistics would you use?

_____

_____

_____

6c. Draw the research model.

7. Study Designs. You want to understand work practices in the accounting departments of fast food chains, so you spend three days at In-N-Out Burger's corporate headquarters watching and interviewing accountants.

7a. What kind of study design is this? _____

_____

7b. What statistics would you use?

_____

_____

_____

_____

7c. Draw the research model.

8. **Data Screening.** You survey a sample of your customers, asking them to report how many times per week they use your software. You provide them with a multiple-choice list of responses and get the following data:

Choice	Uses	Number of subjects who picked
a.	5-6	10
b.	6-7	5
c.	8-9	2
d.	10-11	1
e.	11-12	0
f.	13-14	0
g.	15-16	0

Assume you decide to treat "Uses" as a ratio measure. How would you describe this data (what are the important characteristics of the distribution)?

_____

_____

What can or should you do with this data before using it as a dependent measure in a t-test?

_____

_____

_____

9. Study Designs, Hypothesis testing & SPSS.

Tests of Between-Subjects Effects

Dependent Variable: Knowledge

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	144.110[a]	3	48.037	39.661	.000
Intercept	313.199	1	313.199	258.591	.000
Department	112.610	1	112.610	92.976	.000
Instruction	8.816	1	8.816	7.279	.014
Department * Instruction	2.146	1	2.146	1.771	.198
Error	24.224	20	1.211		
Total	647.160	24			
Corrected Total	168.333	23			

a. R Squared = .856 (Adjusted R Squared = .835)

N=24

What kind of test is this?

What kind of Study Design would you use this for?

Draw the research model:

Interpret the results

10. **Study Designs, Hypothesis testing & SPSS.**

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Home - Office	-168.000	199.332	63.034	-310.594	-25.406	-2.665	9	.026

N=10

What kind of test is this?

_____

What kind of Study Design would you use this for?

_____

Draw the research model:

Interpret the results

_____

_____

_____

11. **Study Designs, Hypothesis testing & SPSS.**

Tests of Between-Subjects Effects

Dependent Variable: Satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	90.057[a]	3	30.019	26.986	.000
Intercept	116.494	1	116.494	104.725	.000
Size	13.746	1	13.746	12.358	.002
Look	15.484	1	15.484	13.920	.001
Size * Look	29.587	1	29.587	26.598	.000
Error	22.248	20	1.112		
Total	339.240	24			
Corrected Total	112.305	23			

a. R Squared = .802 (Adjusted R Squared = .772)

N=24

What kind of test is this?

_____

What kind of Study Design would you use this for?

_____

Draw the research model:

Interpret the results

_____

_____

12. **Concepts.** What are the advantages and disadvantages of a within-subjects (vs. a between-subjects) experimental design?

Advantages:_____

_____

Disadvantages:_____

_____

13. **Concepts.** Give an example of a quasi-independent variable:

_____

When would you use a quasi-independent variable?

_____

What are the disadvantages of using a quasi-independent (vs. true independent) variable?

_____

_____

14. **Concepts.** Why should you care about power in planning a study?

_____

_____

15. Sketch a study proposal to compare user productivity (time to complete a set of tasks) between two spreadsheet applications, in which each participant tries each of the applications in turn. If there are parts of the proposal in which you cannot provide actual content, state what you would put there (e.g., in the Introduction you might say "Here is where I would provide references to related work.").