

**PROJECT: Carnival Game (95 assessment points)**

I need a new game for my carnival. Your group wants to develop a game of chance that can be used as a fund-raiser. Develop an interesting game (no skill involved), decide on the price to play the game and decide on the cash prizes to the winner. Remember, the game will be used as a fundraiser, so it cannot be fair, but it must give the illusion that a customer could win a prize (otherwise, no one will play!). Further, the game **cannot** involve skill -- its outcomes must be purely based on the rules of probability. I will choose one game from each class to add to my carnival! In your formal write up / paper:

**(Paper to be written in this order with these sections/headings)**

	POINTS
I. <b>Description, Rules &amp; Directions:</b> Describe the game & how to play, include an illustration if appropriate. Games ideas must receive prior-approval for full credit. CAUTION 1: DO NOT create a game you cannot analyze theoretically!! CAUTION 2: Most students lose points because they do not thoroughly explain the rules. Make sure someone who knows NOTHING about your game could play it based on your write up <b>only</b> .	10
II. <b>Theoretical Probability I:</b> Analyze your game using one or more of the techniques we have learned in class. Identify the sample space of the possible outcomes and clearly communicate the probability of winning and the probability of losing. I MUST be able to follow your thinking with the work you show.	20
III. <b>Theoretical Probability II:</b> To show how much money you expect the game to make per play, calculate the expected value. Organize work into a probability distribution chart. Don't forget to account for how much the game costs to play.	5
IV. <b>Relative Frequencies:</b> Run three simulations: 1) Actually play the game for 50 trials. Record the relative frequencies for winning and losing along with the average \$ gained/lost per trial. 2) Design a second simulation for 100 trials using the random number generator on our calculator. Clearly describe your simulation, set-up and procedure. Record the relative frequencies for winning/losing along with the average \$ gained/lost per trial. Include data from trials in appendix. 3) Design a third simulation for 500 trials. Clearly describe your simulation, set-up and procedure. If you use an online simulator, include the web address and a screen shot. Record the relative frequencies for winning/losing along with the average \$ gained/lost per trial. 4) In a paragraph, compare/contrast the simulations to each other.	20
V. <b>Summary:</b> In a paragraph or two, summarize your game and why I should choose your game. Summary should include (but is not limited to) a discussion of both the theoretical expected value and the average \$ gained/lost per trial from the simulations. Remember you are trying to convince me to choose YOUR game over all the others created. Include a paragraph that discussing the role of each group member in this project.	15
VI. <b>Create</b> your game including any game pieces/mock prizes needed. Your game will be tested in class. It will be played <u>without</u> you being present. Make sure to include directions & game title. Most students lose points because their directions are incomplete and/or unclear.	20
VII. <b>Format:</b> Your paper should be in proper MLA format, including labeling of figures and tables. It should have a short introduction, proper grammar/writing conventions, and a title. Actual individual results of Simulation 2 included as an appendix.	5

## CARNIVAL GAME PROJECT RUBRIC

\*Paper clip this rubric with group names to the TOP of your project paper.

<b>I. Description, Rules &amp; Directions:</b> <ul style="list-style-type: none"> <li>• Game clearly described. Can understand without looking at created game.</li> <li>• Specific rules, well written and clear</li> <li>• Illustration</li> <li>• Clearly indicate the perspective taken (player's point of view or operator's)</li> </ul>	10	
<b>II. Theoretical Probability I</b> <ul style="list-style-type: none"> <li>• Analysis is correct, thorough and easy to follow</li> <li>• Probabilities use correct notation <math>P( )=</math></li> <li>• Analysis uses tree diagrams or charts IF appropriate</li> <li>• Shows probability of each outcome as well as overall probability of win/loss.</li> <li>• Clearly indicate the perspective taken (player's point of view or operator's)</li> </ul>	20	
<b>III. Theoretical Probability II</b> <ul style="list-style-type: none"> <li>• Expected value (gain/loss per play) &amp; calculations</li> <li>• Probability distribution chart</li> </ul>	5	
<b>IV. Relative Frequencies / Experimental Probabilities:</b> <b>Simulation 1: playing the game</b> <ul style="list-style-type: none"> <li>• Table of results of 50 trials</li> <li>• Relative frequencies recorded</li> <li>• Average \$ gained/lost per trial with work shown</li> </ul> <b>Simulation 2:</b> <ul style="list-style-type: none"> <li>• Clearly describe your simulation, set-up &amp; procedure;</li> <li>• Results of 100 trials indicated</li> <li>• Summarize the results of simulation with average \$ gained/lost per trial</li> </ul> <b>Simulation 3:</b> <ul style="list-style-type: none"> <li>• Clearly describe your simulation, set-up &amp; procedure; includes web address if online simulator is used</li> <li>• Results of 500 trials indicated</li> <li>• Summarize the results of simulation with average \$ gained/lost per trial</li> </ul> <b>Compares/Contrasts the simulations – paragraph</b>	20	
<b>V. Summary</b> <ul style="list-style-type: none"> <li>• Tells why game is a good money-maker for the fundraiser</li> <li>• Discusses both the theoretical and the simulation expected values</li> <li>• Proper writing &amp; grammar; Paragraph format</li> <li>• Convincing argument to choose this groups' game</li> <li>• Clearly indicate the perspective taken (player's point of view or operator's)</li> <li>• Discusses role of each group member</li> </ul>	15	
<b>VI. Constructed game:</b> <ul style="list-style-type: none"> <li>• Name of game displayed</li> <li>• Easy to follow written instructions included separate from the paper</li> <li>• Pieces/parts included</li> <li>• Well-constructed / quality</li> </ul>	20	
<b>VII. Format</b> <ul style="list-style-type: none"> <li>• MLA format</li> <li>• Proper writing/grammar</li> <li>• Organized; introduction, appendix of data</li> </ul>	5	