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The Capture-Recapture Method

Exercise

Leading a Development Team  
Software Engineering Institute

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The Capture-Recapture Method

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| **Overview** | In this exercise, you will simulate an inspection using a deck of cards. Following the inspection, you will estimate the number of “defects” remaining after the inspection.  The *product* to be inspected is a deck of playing cards. In this simulation, defects are all of the face cards (i.e., Jacks, Queens, and Kings). |

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| **Approach** | Depending on the size of the class and the instructor’s preference, this exercise may be conducted as an instructor-led exercise or a multi-group exercise. The instructions below are intended for a multi-group exercise. For the instructor-led exercise, a projected worksheet tool replaces the worksheet that is presented on page 4. |

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| **Instructions** | 1. Break out into groups as guided by the instructor. 2. Within your group, designate the roles of inspectors A, B, and C, D, etc. depending on how many individuals are in your group.   *An assumption in this simulation is that the historical inspection yield for Inspector A is 0.5 and the historical yield for all other inspectors is 0.25.Given these historical inspection yields, Inspector A will draw twice as many cards as the other inspectors to simulate the two-fold effectiveness of Inspector A compared with the other inspectors.*  **The inspection**   1. *Inspector A* shuffles the cards thoroughly and then draws 26 cards from the top of the deck. 2. *Inspector A* records the face cards that are in the 26 card deck by marking a “1” in the appropriate column of the form on page 4. 3. Inspector B now takes the 52-card deck and shuffles the deck thoroughly. Inspector B draws 13 cards from the top of the deck and records the face cards that were found in the stack on the form by marking an “X” within the appropriate cell of the column labeled, “Inspector B.” 4. Step #5 is repeated for all other inspectors in the group (i.e., C, D, etc.) |



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| **Instructions, cont.** | **Compiling the inspection results**   1. Transfer the results of the column labeled, “Inspector A” to the column labeled, “Capture.” 2. In the column labeled, “Found B-D,” mark an “X” in a cell if the face card was found by any of the inspectors except Inspector A. 3. In the column labeled, “Recapture,” mark an “X” in a cell for each row where there is an “X” in both a “Capture” cell *and* an adjacent “Found B-D,” cell. 4. In the column labeled, “Found,” mark an “X” in the cell if either the “Capture” cell *or* the “Found B-D” cell 5. Tally the number of X’s in each column of the matrix and enter the totals along the “Total” row. 6. Calculate the *inspection yield* by dividing the “Total” in each column by 12, the actual number of face cards (i.e., defects). Enter the values along the “Inspection Yield” row. 7. Using the values in the form, calculate the values that are listed in the following table in the column, “Record values here …”. |

|  |  |  |
| --- | --- | --- |
| Item | Formula | Record values here … |
| Total estimated defects(TED) | (CAP \* AF) / REC |  |
| Total defects found (TDF) | (CAP \* AF) - REC |  |
| Estimated defects remaining (EDR) | TED - TDF |  |
| Actual defects remaining | 12 - TDF |  |

Data Collection Table

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Inspectors | | | | |  |  |  |  |
|  | Face card | A | B | C | D | E | Capture (CAP)[[1]](#footnote-1) | Found by B-D (FBD)[[2]](#footnote-2) | Recapture (REC)[[3]](#footnote-3) | Found[[4]](#footnote-4) |
|  | Jack |  |  |  |  |  |  |  |  |  |
| Queen |  |  |  |  |  |  |  |  |  |
| King |  |  |  |  |  |  |  |  |  |
|  | Jack |  |  |  |  |  |  |  |  |  |
| Queen |  |  |  |  |  |  |  |  |  |
| King |  |  |  |  |  |  |  |  |  |
|  | Jack |  |  |  |  |  |  |  |  |  |
| Queen |  |  |  |  |  |  |  |  |  |
| King |  |  |  |  |  |  |  |  |  |
|  | Jack |  |  |  |  |  |  |  |  |  |
| Queen |  |  |  |  |  |  |  |  |  |
| King |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total |  |  |  |  |  |  |  |  |  |
| Inspection Yield |  |  |  |  |  |  |  |  |  |

1. The face cards (i.e., defects) found by Inspector A. [↑](#footnote-ref-1)
2. The face cards found by any inspector *except* Inspector A. [↑](#footnote-ref-2)
3. The face cards that were found by Inspector A *and* any other inspector. [↑](#footnote-ref-3)
4. The face cards that were found by eitherInspector A *or* any other inspector. [↑](#footnote-ref-4)