

**Statistics 3080**  
**Homework 1**  
**Due: Wednesday, September 13**

Complete the following problems in a commented R file. Include any output requested as a comment following your code.

**Problem 1 (30 points):** Create, store, and print the following sequences. You may use the concatenate function to combine two sequences, but not as the only mechanism to yield the answer.

(a) `[1] "a" "a" "a" "a"`

(b) `[1] 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32`  
`[17] 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64`  
`[33] 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96`  
`[49] 98 100`

(c) `[1] 0 0 0 0 1 1 1 2 2 3`

(d) `[1] 1 1 1 2 2 2 3 3 3`

(e) `[1] 1 2 3 4 5 4 3 2 1`

(f) `[1] 1 2 3 4 5 6 7 8 9 10`

(g) `[1] 1 1/2 1/3 1/4 1/5 1/6 1/7 1/8 1/9 1/10`

\* It is fine if the printed vector is shown in decimal form

(h) `[1] 1 8 27 64 125 216`

\* These are all cubes

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(i) [1] 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976
    [14] 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989
    [27] 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002
    [40] 2003
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(j) [1]    0    25    50    75   100   125   150   175   200   225   250   275   300
    [14]  325   350   375   400   425   450   475   500   525   550   575   600   625
    [27]  650   675   700   725   750   775   800   825   850   875   900   925   950
    [40]  975 1000
```

**Problem 2 (20 points):** Dave and Nancy have spent a week in Las Vegas. Every day, Dave has camped out at the poker table and Nancy has kept to the roulette wheel. At the end of the week, they decide to analyze their winnings and losses. For simplicity, we will use earnings to refer to both winnings and losses.

- (a) Create and save a vector called `poker_vect` and `roulette_vect` containing the following information:
  - On Monday, Dave won \$140 and Nancy lost \$30
  - On Tuesday, Dave lost \$50 and Nancy lost \$50
  - On Wednesday, Dave won \$20 and Nancy won \$100
  - On Thursday, Dave lost \$120 and Nancy lost \$225
  - On Friday, Dave won \$240 and Nancy won \$20
- (b) Create, save, and print a vector that contains the couple's total daily earnings.
- (c) Determine the couple's total earnings over the week.
- (d) Determine the percentage of the couple's total earnings that is due to Dave's poker games.
- (e) Determine the average daily earnings of Nancy's roulette adventures.
- (f) Whose average daily earnings is higher?
- (g) Use the vectors you have created to determine which days Nancy won. You should specify the days of the week as well as show what you used to determine them.
- (h) Subset the vector `roulette_vect` to show Nancy's winning amounts.

**Problem 3 (35 points):** A metro rider tracks her morning and evening commute times every day for four weeks. The values in minutes are given below.

Morning: 42, 29, 34, 37, 28, 60, 36, 27, 35, 55, 30, 29, 42, 33, 31, 24, 36, 40, 46, 43

Evening: 38, 46, 59, 39, 38, 55, 61, 42, 54, 65, 42, 39, 36, 55, 48, 41, 57, 43, 37, 44

- (a) Create, save, and print a 20x2 matrix with the morning commute times in the first column and the evening commute times in the second column.
- (b) Starting with your matrix, determine how many days her morning commute was more than 30 minutes.
- (c) Starting with your matrix, determine how many days her evening commute was longer than her morning commute.
- (d) Create, save, and print two 4x5 matrices – one containing the morning commute times and the other containing the evening commute times.
- (e) Determine the week during which she had the longest morning commute times on average.
- (f) Determine the day of the week on which she had the shortest evening commute times on average.
- (g) On the third Friday, she made a recording error. Her evening commute time that day should actually be 38 minutes. Modify both of the matrices that this error affects with the updated value.
- (h) Does the recording error change any of your previous answers? If so, which and why?
- (i) During the second week of her study, there was track work being conducted on the metro line, so she decides to remove that week before conducting future analyses. Save her updated weekly matrices with new names and print them.