# Exercises

1. A radio executive considering a switch in his station's format collects data on the radio preferences of various age groups of listeners.

(1) Using the following cross-tabulation, test the null hypothesis that radio format preference does not differ by age group. Interpret the results.

(2) Compute the row and column proportions and plot a mosaic display of this table.

| *Radio Format Preference* | *Age* | | |
|---|---|---|---|
| | Young Adult | Middle Age | Older Adult |
| Music | 14 | 10 | 3 |
| News-talk | 4 | 15 | 11 |
| Sports | 7 | 9 | 5 |

Ref: J Levin and J. A. Fox, Elementary Statistics in Social Research, 10th ed. (Pearson Education Inc., Boston, 2006) pp.322-323.

2. The Arthritis data is available in case form in the vcd package. There are two explanatory factors: Treatment and Sex. Age is a numeric covariate, and Improved is the response.

(1) Excluding ID and Age , convert the Arthritis data in case form to a 3-way table of Treatment × Sex × Improved.
(2) Plot a mosaic display for the above three-way table.
(3) Use the mantelhaen.test function to perform a Cochran-Mantel-Haenszel chi-square test of the null hypothesis that two nominal variables (Treatment and Sex) are conditionally independent of Improved. Interpret the results.
(4) Plot a doubledecker display given in (1).
(5) Plot a mosaic display for two-way table of Treatment × Improved with Sex=Female. Use gp=shading_max.