Definition (Contingency table)

Let x_i and y_i be the values of two categorical variables associated to the ith individual in the population U ($i = 1, 2, \cdots, N$), where x takes K_x different categories and y takes K_y different categories. A *contingency table* is a matrix-like table that shows, in the cell (k_x, k_y), the frequency of elements taking the k_xth category of x and the k_yth category of y simultaneously (for $k_x = 1, 2, \cdots, K_x$ and $k_y = 1, 2, \cdots, K_y$).

x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Fail	F	Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	F	Pass	D	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	F	Pass	D	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	F	Pass	D	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Fail	E	Pass	D	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	D	Pass	C	Pass	B
Fail	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	D	Pass	C	Pass	B
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	D	Pass	C	Pass	B
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	D	Pass	C	Fail	A
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Fail	C	Pass	C	Pass	A
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Pass	C	Pass	A
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Pass	C	Pass	A
Pass	F	Pass	F	Pass	F	Pass	E	Pass	D	Pass	C	Fail	B	Pass	A

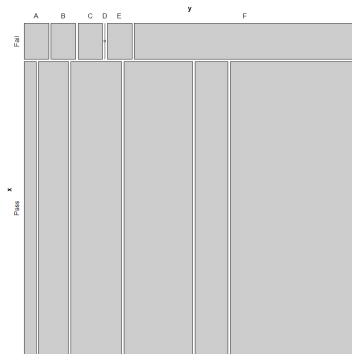Table: Results of $N = 120$ students in an assignment and an exam in statistics

Figure: Mosaic plot of the grades in a home assignment and an exam of 120 students.