

# Exercise 1

Due date: May 15, 2018 at class

1. The table below is the summary of age and height of a sandlot team.

Number	1	2	3	4	5	6	7	8	9	10
Height (X)	155	165	160	170	150	160	165	170	165	155
Age (Y)	13	15	14	15	12	13	14	15	15	12

- (a) Find the mean, variance, and standard deviation of  $X$ .
  - (b) What is the correlation between height and age? Is it positive or negative?
  - (c) On average how much does height increase per age?
2. As noted, the correlation coefficient ranges  $[-1, 1]$ . For a variable  $X$ , find a variable  $Y$  that makes  $\text{corr}(X, Y)$  equal to (a) 1; (b) 0; and (c) -1.
3. A car factory has two production lines A and B, where line A produces 60% and B 40% of the total products. The rejection rate of A is 10%, while that of B is 20%. Calculate the overall rejection rate of this factory (use the law of total probability).
4. Answer the following questions based on figure 1 and 2
- (a) Is the probability of getting 7 or more heads out of 10 tosses of a coin the same as the probability of getting 70 or more heads by tossing the same coin 100 times? If not, which is bigger?
  - (b) Let  $X$  be the number of heads in 10 tosses of a fair coin. Express the probability of the event of “getting less than 2 or more than 8 heads” in the form of  $P(\dots)$ . Based on Fig.1, decide whether this probability is bigger than 0.1.