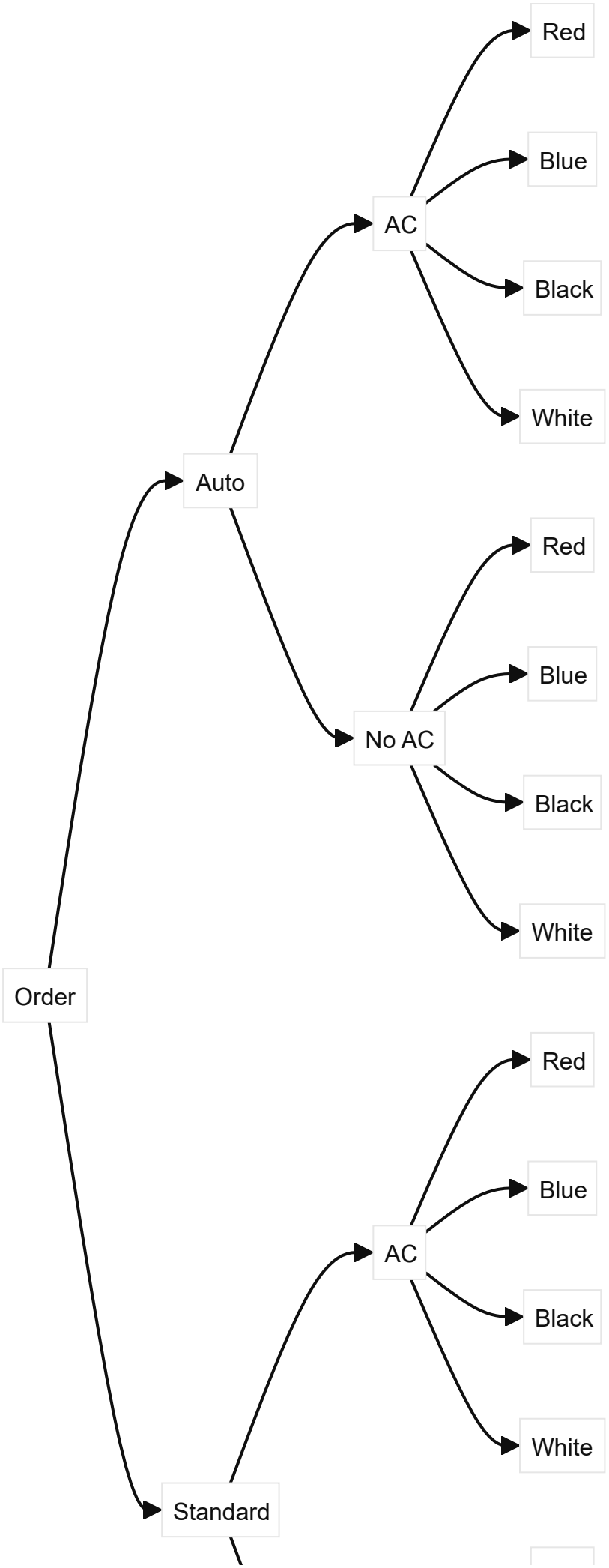
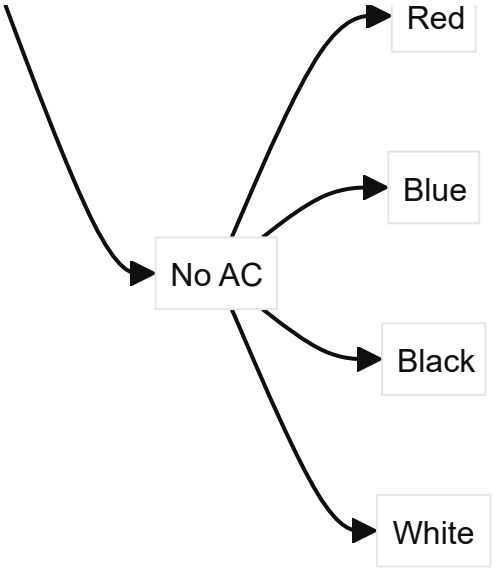
HW1-STAT312

2-14

An order for an automobile can specify transmission (auto/standard), no air / air conditioning, and color (red/blue/black/white). Draw a tree diagram to represent the possible orders for this experiment:


Order
Auto
AC
Red
Blue
Black
White
No AC
Red
Blue
Black
White
Standard
AC
Red
Blue
Black
White



From the tree diagram the cardinality of S is 16.

2-36

Given 3 machine tools, 4 polishing tools, 3 painting tools, how many different routings are there (consisting of machining, then polishing, then painting).

There are $3 * 4 * 3 = 36$ different routings.

2-42

12 different locations can accommodate chips, if there are 5 chips on the board, how many layouts possible?

There are $C_5^{12} = \frac{12!}{7!5!} = \frac{12*11*10*9*8}{5*4*3*2} = 12 * 11 * 2 * 3 = 792$ layouts.

2-48

Plastic parts produced by an injection-molding operation are checked for conformance to specifications. Each tool contains 12 cavities in which parts are produced, and these parts fall into a conveyor when the press opens. An inspector chooses 3 parts from among the 12 at random. Two cavities are affected by a temperature malfunction that results in parts that do not conform to specifications. Assume order is not important.

a

How many samples contain exactly one non conforming part?

$2 * C_2^{10} = 10 * 9 = 90$ **samples contain exactly one non conforming part.**

b

How many samples contain at least one non conforming part?

$90 + 10 = 100$ **samples contain at least one non conforming part.**

2-50

a) $A \cap B$

$44 + 12 = 56$

b) A'

$56 + 36 = 92$

c) $A \cup B$

$12 + 40 + 44 + 16 + 56 = 168$

d) $A \cup B'$

$12 + 40 + 44 + 16 + 36 = 148$

e) $A' \cap B'$

36