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Scheduling Algorithms (1)
- Orientation -

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Production Scheduling Problems

   For production management, the scheduling for product manufacturing is the most important work. The scheduling problem is to decide how to make products. The task to maximize corporate benefit through production management is very important.

   In this class, the basic scheduling algorithms and recent technologies are introduced, and using actual examples from factories, several kinds of approaches are discussed.

Purpose

- ☐ acquire the basic knowledge of production management and scheduling.

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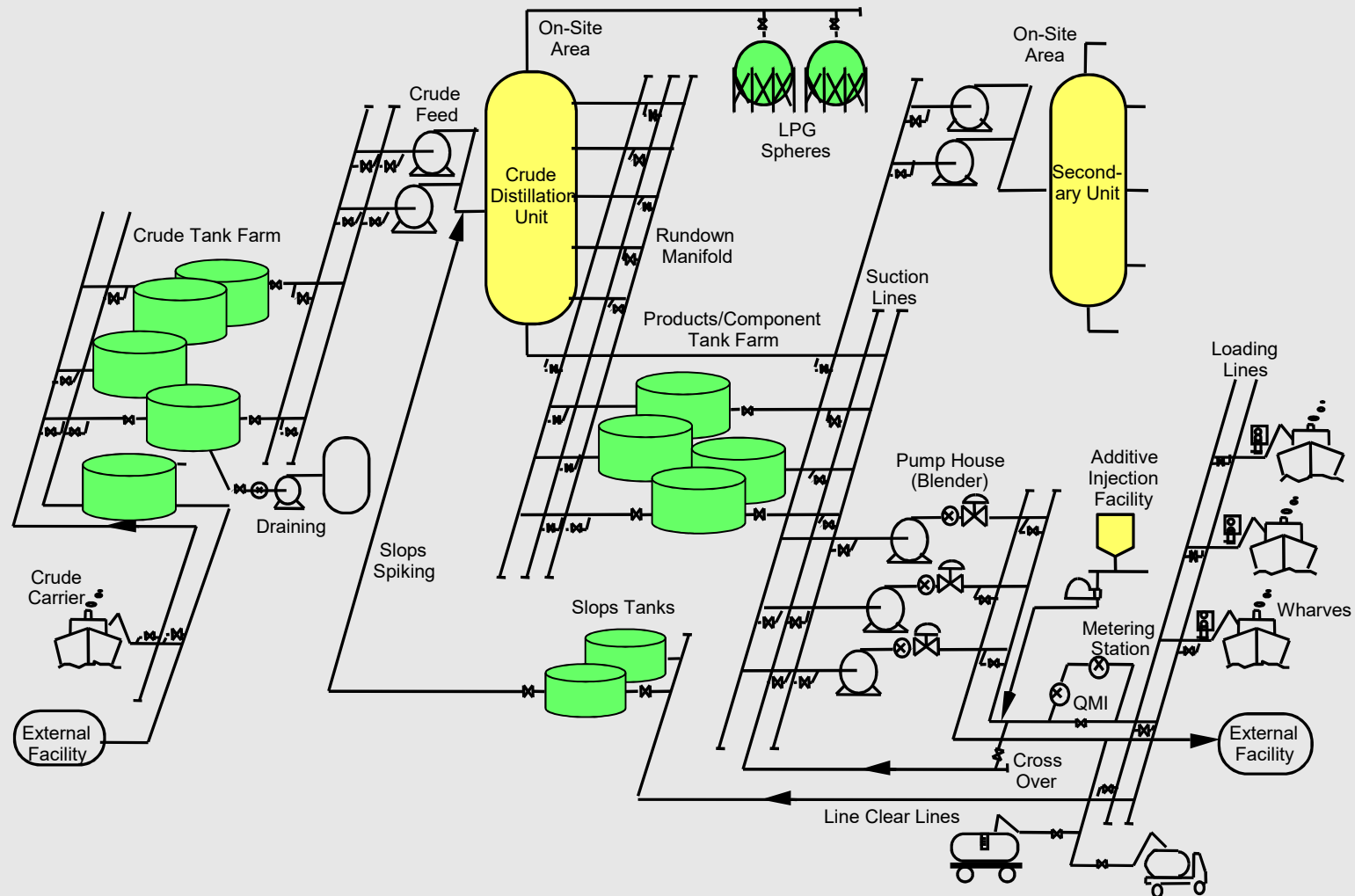# Production Scheduling Problems

- Decision Making Problems

     Optimization Problems

In today's class guidance,

 1) What is scheduling problems?

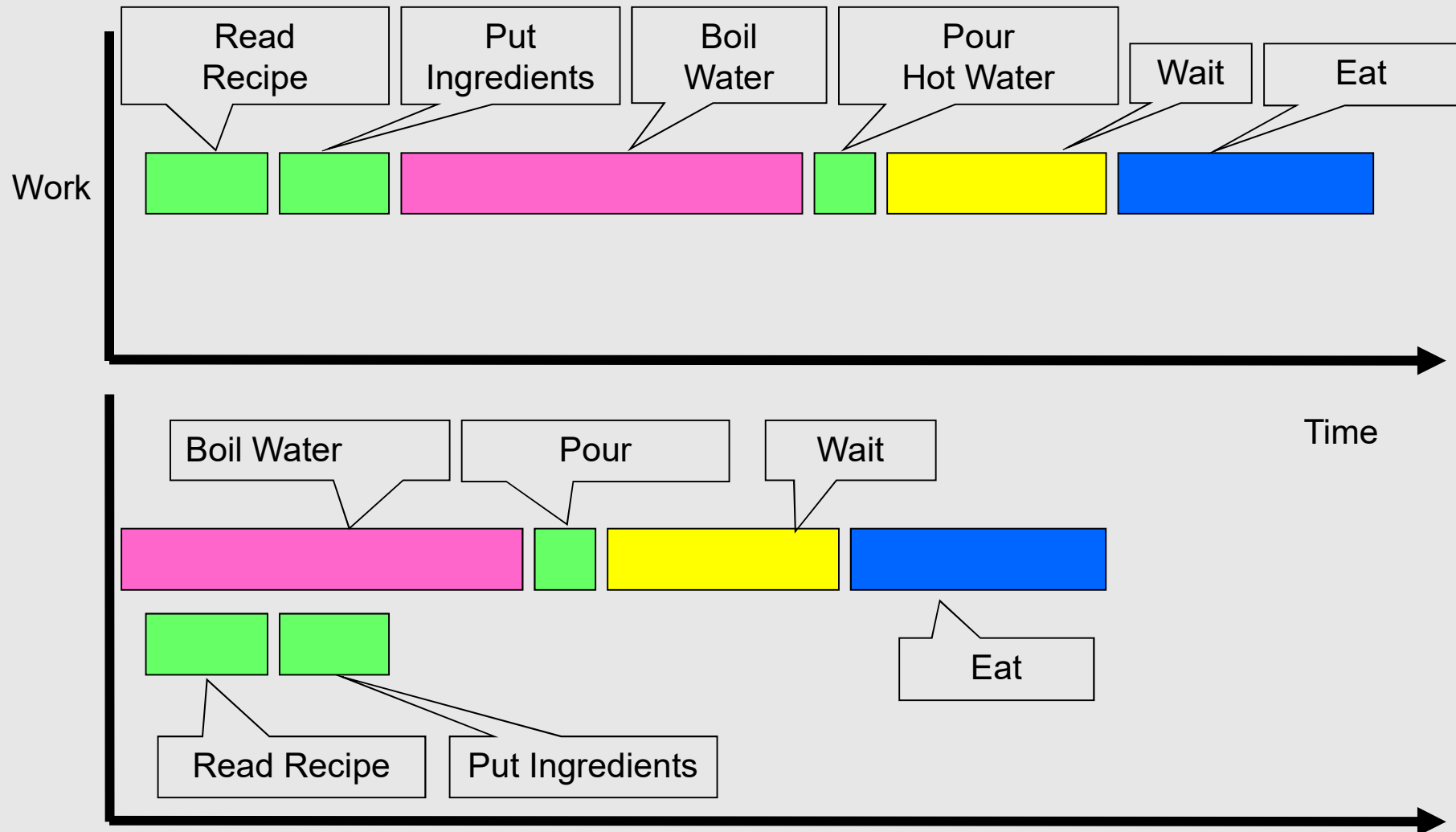 2) Why is it difficult to solve them?

Oil Refinery Process Overview

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Many kinds of Scheduling Problems

☐ Sequencing of Study for Examinations

☐ Routing Tour for Sightseeing

☐ Activity Scheduling for today

☐ Scheduling of Cooking Procedure

etc.

Let's try to make Instant Noodle!

Let's try to make Instant Noodle!

Work

| Read Recipe | Put Ingredients | Boil Water | Pour Hot Water | Wait | Eat |

Time

| Boil Water | Pour | Wait |

| Read Recipe | Put Ingredients |

Eat

Question :

What kinds of constraints are there
in this problem?

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Question：
Let's try to make 2 kinds of Noodles!

Question :
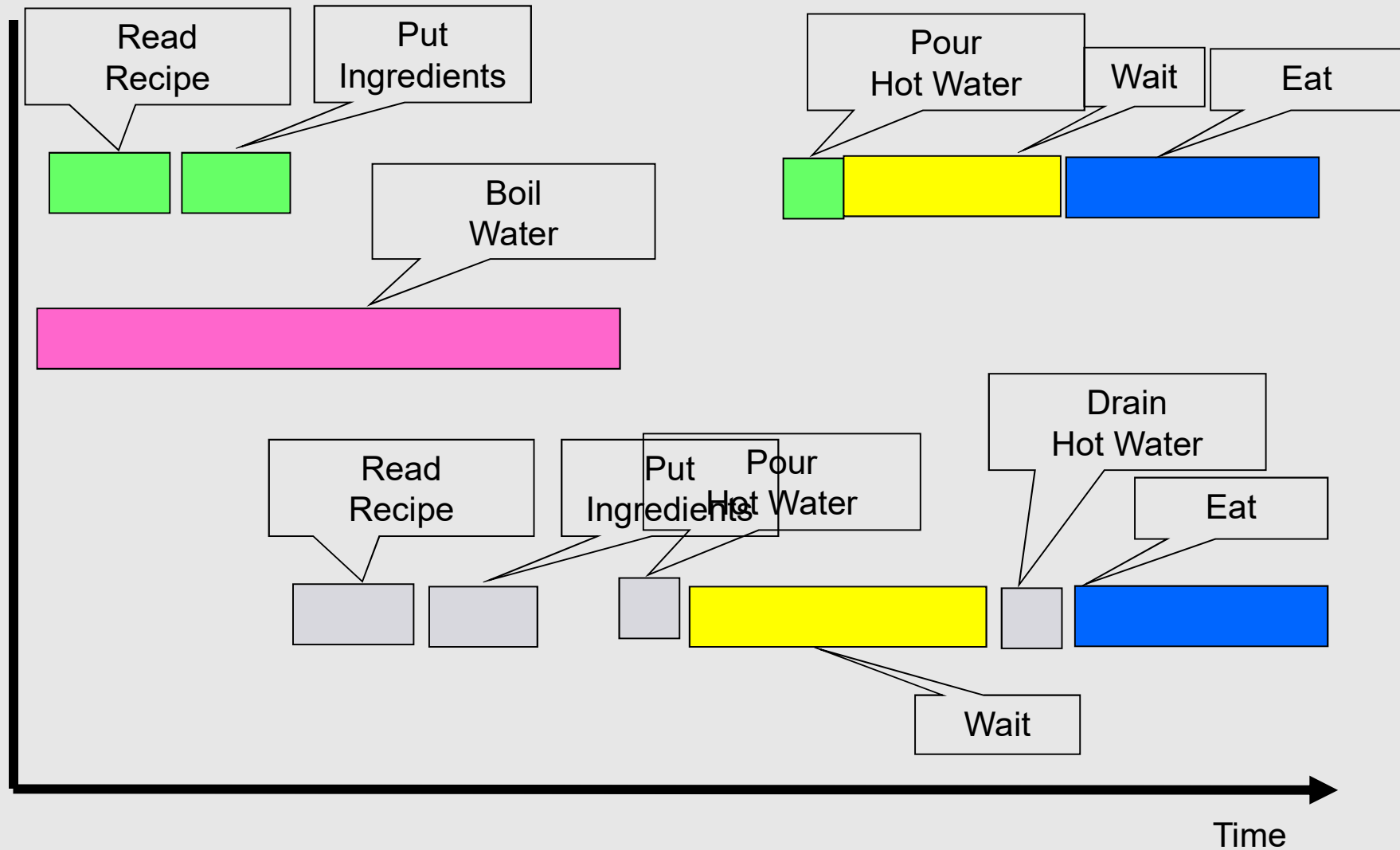# Let's try to make 2 kinds of Noodles!

Additional constraints

☐ Recipes are different

   Procedure, Waiting time, Kinds of Ingredients, …

☐ Boil water once for two cups

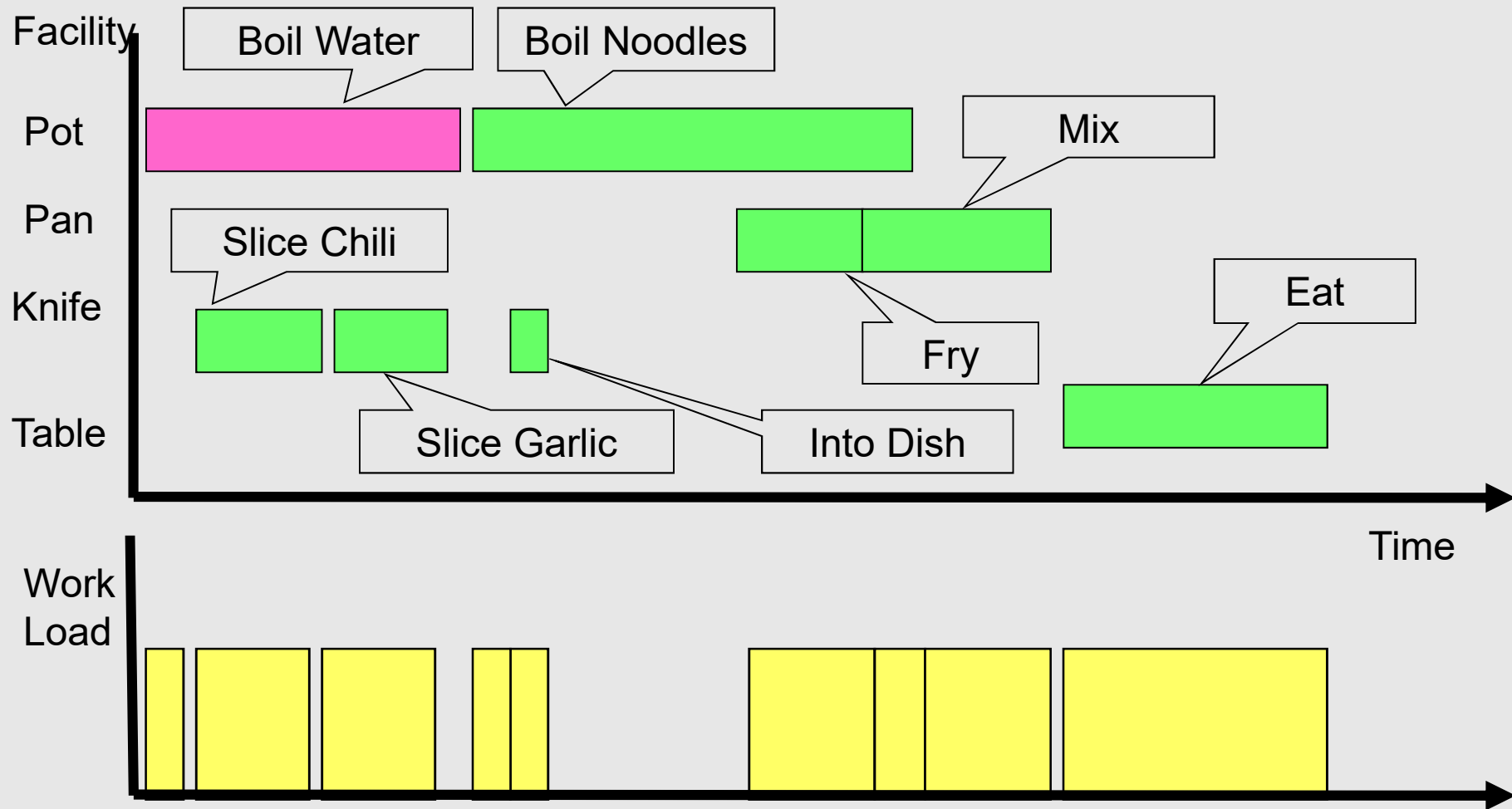☐ Start to eat together !!

Let's try to make 2 Noodles!

# Let's try to make Peperoncino! (one kind of pasta)

Recipe

☐ Boil water in a pot and boil noodles.

　　（boiling time is different for quantity)

☐ Slice chili and garlic and fry them in a pan.

☐ Put noodles in a pan and mix with chili and garlic.

☐ Eat as soon as possible.

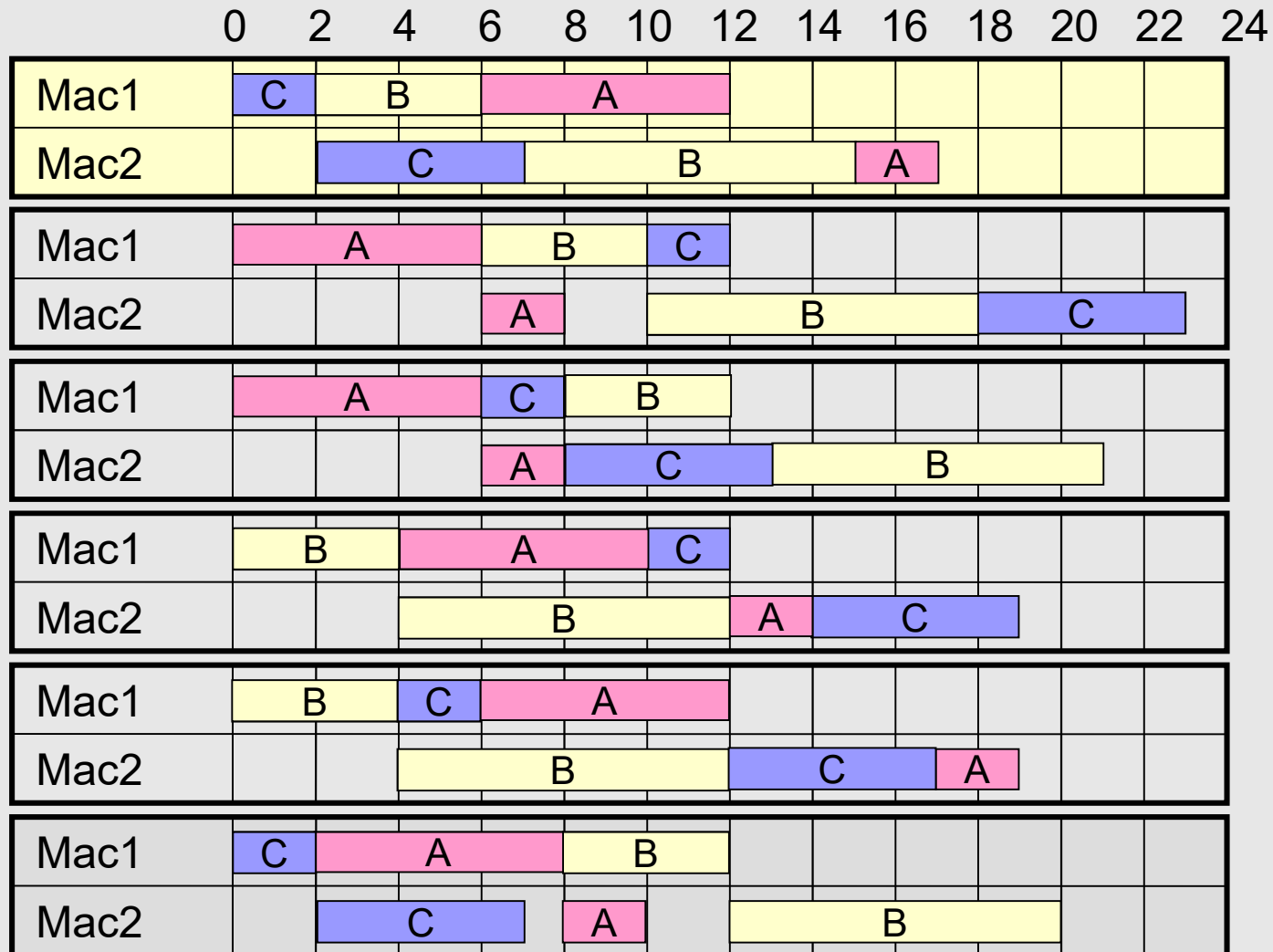# How to make Peperoncino

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Small-size Flow Shop Scheduling Problem

There are 3 jobs using Machine1 and Machine2.
Find the optimal production permutation
to minimize the total processing time (makespan).

A

B → Mac1 → Mac2 →

C
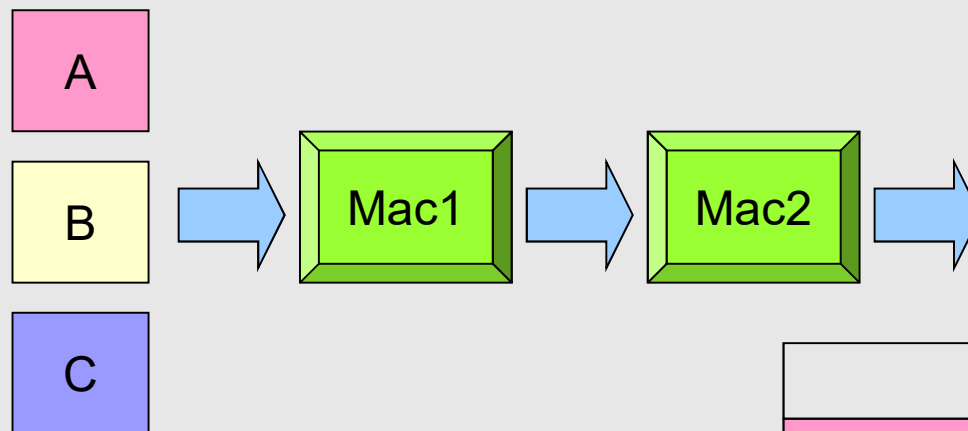
	Mac 1	Mac 2
Job A	6h	2h
Job B	4h	8h
Job C	2h	5h

Scheduling Results

If number of jobs becomes 100, what's happened?

$$_{100}P_{100} = 100!$$

=93326215443944152681699238856266700490715968264381621468592963895217599993229915608941463976156518286253697920827223758251185210916864000000000000000000000000

Why is Scheduling important?

To Satisfy Required Qualities（Product Quality ＋Delivery Quality）

Scheduling is to make a time schedule of operations. It is used …

- to confirm that the schedule is feasible for strict conditions.

- to confirm that the schedule is the best way for priority conditions

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Thank
you

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