

# **Scheduling Repetitive Production**

**Student Guide**

Course Code 14500GC10  
Edition 1.0  
Month October 2000  
Part Number M012798

**ORACLE®**

**Copyright © Oracle Corporation, 2000. All rights reserved.**

This documentation contains proprietary information of Oracle Corporation. It is provided under a license agreement containing restrictions on use and disclosure and is also protected by copyright law. Reverse engineering of the software is prohibited. If this documentation is delivered to a U.S. Government Agency of the Department of Defense, then it is delivered with Restricted Rights and the following legend is applicable:

#### **Restricted Rights Legend**

Use, duplication or disclosure by the Government is subject to restrictions for commercial computer software and shall be deemed to be Restricted Rights software under Federal law, as set forth in subparagraph (c)(1)(ii) of DFARS 252.227-7013, Rights in Technical Data and Computer Software (October 1988).

This material or any portion of it may not be copied in any form or by any means without the express prior written permission of the Education Products group of Oracle Corporation. Any other copying is a violation of copyright law and may result in civil and/or criminal penalties.

If this documentation is delivered to a U.S. Government Agency not within the Department of Defense, then it is delivered with "Restricted Rights," as defined in FAR 52.227-14, Rights in Data-General, including Alternate III (June 1987).

The information in this document is subject to change without notice. If you find any problems in the documentation, please report them in writing to Worldwide Education Services, Oracle Corporation, 500 Oracle Parkway, Box SB-6, Redwood Shores, CA 94065. Oracle Corporation does not warrant that this document is error-free.

Oracle and all references to Oracle Products are trademarks or registered trademarks of Oracle Corporation.

All other products or company names are used for identification purposes only, and may be trademarks of their respective owners.

## **Author**

Bill Figini

## **Technical Contributors and Reviewers**

Pam Freeman, John Paramore

**This book was published using:**

**Oracle<sup>®</sup> Tutor<sup>™</sup>**



# Table of Contents

---

<b>Scheduling Repetitive Production .....</b>	<b>1-1</b>
Oracle Work in Process Release 11i.....	1-2
Objectives .....	1-3
Agenda.....	1-4
Lesson 1: Overview .....	1-5
Overview .....	1-6
Overview (continued).....	1-7
Lesson 2: Concepts in Repetitive Line Scheduling.....	1-9
Elements of Repetitive Line Scheduling.....	1-10
Repetitive Line Scheduling Elements (continued).....	1-11
Daily Line Capacity Example.....	1-15
Review Question.....	1-16
Answer to Review Question .....	1-17
Lesson 3: Combined Assembly and Line Attributes.....	1-18
Combined Assembly and Line Attributes.....	1-19
Review Question.....	1-20
Answer to Review Question .....	1-21
Lesson 4: Production Lines in Repetitive Production.....	1-22
Production Lines in Repetitive Production.....	1-23
Repetitive Schedule Quantities.....	1-24
Repetitive Schedule Dates and Times.....	1-25
Repetitive Schedule Routing .....	1-26
Review Question.....	1-27
Answer to Review Question .....	1-28
Lesson 5: Scheduling Repetitive Schedules.....	1-29
Mass Loading Repetitive Schedules .....	1-30
Mass Loading Status.....	1-31
Importing Repetitive Schedules.....	1-32
Scheduling Repetitive Schedules.....	1-33
Scheduling Repetitive Shifts.....	1-34
Scheduling Repetitive Schedules: Option 1.....	1-35
Scheduling Repetitive Schedules: Option 2.....	1-36
Review Question.....	1-37
Answer to Review Question .....	1-38
Review Question.....	1-39
Answer to Review Question .....	1-40
Review Question.....	1-41
Answer to Review Question .....	1-42
Lesson 6: Rescheduling Repetitive Schedules.....	1-43
Benefits of Rescheduling.....	1-44
Changing Schedule Attributes .....	1-45
Changing Dates.....	1-46
Changing Processing Days .....	1-47
Changing the Daily Rate.....	1-48
Changing the Total Quantity.....	1-49
Review Question.....	1-50
Answer to Review Question .....	1-51
Lesson 7: Sequencing a Repetitive Production.....	1-52
Sequencing Your Production Meaningfully .....	1-53
Example of Sequencing .....	1-54
Repetitive Line Report.....	1-55

Making Changes .....	1-56
Using Other Prioritizing Applications .....	1-57
Lesson 8: Summary .....	1-58
Summary.....	1-59
Summary (continued).....	1-60
Practice 1 Overview.....	1-61
Practice 1 Solution.....	1-62
Practice 2 Overview.....	1-64
Practice 2 Solution.....	1-65

# Preface

---

## Profile

### Before You Begin This Course

Before you begin this course, you should have the following qualifications:

- Thorough knowledge and proficiency in navigating Oracle applications
- Working experience with *a repetitive scheduled manufacturing company*

### Prerequisites

- *Create and Update Repetitive Schedules (e-class)*

### How This Course Is Organized

*Scheduling Repetitive Production* is an instructor-led course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

## Related Publications

### Oracle Publications

<b>Title</b>	<b>Part Number</b>
<i>Oracle Work in Process User's Guide</i>	<i>A83598-01</i>
<i>&lt;insert&gt;</i>	<i>Axxxxxx</i>
<i>&lt;insert&gt;</i>	<i>Axxxxxx</i>
<i>&lt;insert&gt;</i>	<i>Axxxxxx</i>

### Additional Publications

- System release bulletins
- Installation and user's guides
- *read.me* files
- *Oracle Magazine*

# Typographic Conventions

## Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The <i>algorithm</i> inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: <code>debug.set ('I", 300);</code> Directory: <code>bin (DOS), \$FMHOME (UNIX)</code> Filename: Locate the <code>init.ora</code> file. Password: User <code>tiger</code> as your password. Pathname: Open <code>c:\my_docs\projects</code> URL: Go to <code>http://www.oracle.com</code> User input: Enter <code>300</code> Username: Log on as <code>scott</code>
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address ( <i>but</i> Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do <i>not</i> save changes to the database. For further information, see <i>Oracle7 Server SQL Language Reference Manual</i> . Enter <code>user_id@us.oracle.com</code> , where <i>user_id</i> is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish.  This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.

Convention	Element	Example
Arrow	Menu paths	Select File→ Save.
Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

## Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	When-Validate-Item
Lowercase	Column names, table names	SELECT last_name FROM s_emp;
	Passwords	DROP USER scott IDENTIFIED BY tiger;
	PL/SQL objects	OG_ACTIVATE_LAYER (OG_GET_LAYER (`prod_pie_layer`))
Lowercase italic	Syntax variables	CREATE ROLE <i>role</i>
Uppercase	SQL commands and functions	SELECT userid FROM emp;

## Typographic Conventions in Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select Invoice > Entry > Invoice Batches Summary.
2. (M) From the menu, select Query > Find.
3. (B) Click the Approve button.

## Notations :

(N) = Navigator

(M) = Menu

(T) = Tab

(I) = Icon

(H) = Hyperlink

(B) = Button

## Typographical Conventions in Help System Paths

This course uses a “navigation path” convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

(Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.
2. Under the General Ledger entry, expand Journals.
3. Under Journals, select Enter Journals.
4. Review the Enter Journals topic that appears in the document frame of the help system window.

## Getting Help

Oracle Applications provides you with a complete online help facility.

Whenever you need assistance, simply choose an item from the Help menu to pinpoint the type of information you want.

## **To display help for a current window:**

1. Choose Window Help from the Help menu, click the Help button on the toolbar, or hold down the Control key and type 'h'.

A web browser window appears, containing search and navigation frames on the left, and a frame that displays help documents on the right.

The document frame provides information on the window containing the cursor. The navigation frame displays the top-level topics for your responsibility, arranged in a tree control.

2. If the document frame contains a list of topics associated with the window, click on a topic of interest to display more detailed information.
3. You can navigate to other topics of interest in the help system, or choose Close from your web browser's File menu to close help.

## **Searching for Help**

You can perform a search to find the Oracle Applications help information you want. Simply enter your query in the text field located in the top-left frame of the browser window when viewing help, then click the adjacent Find button.

A list of titles, ranked by relevance and linked to the documents in question, is returned from your search in the right-hand document frame. Click on whichever title seems to best answer your needs to display the complete document in this frame. If the document doesn't fully answer your questions, use your browser's Back button to return to the list of titles and try another.

# **Scheduling Repetitive Production**

## **Chapter 1**

**Oracle Work in Process Release 11i**

**Scheduling Repetitive Production**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Objectives

---

### Objectives

After completing this lesson, you should be able to do the following:

- Explain concepts in repetitive line scheduling
- Set up repetitive line scheduling
- Schedule repetitive schedules
- Reschedule repetitive schedules
- Sequence repetitive production

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE®

# Agenda

---

## Agenda

- **Lesson 1: Overview**
- **Lesson 2: Concepts in repetitive line scheduling**
- **Lesson 3: Combined assembly and line attributes**
- **Lesson 4: Production lines in repetitive production**
- **Lesson 5: Scheduling repetitive schedules**
- **Lesson 6: Rescheduling repetitive schedules**
- **Lesson 7: Sequencing a repetitive production**
- **Lesson 8: Summary**

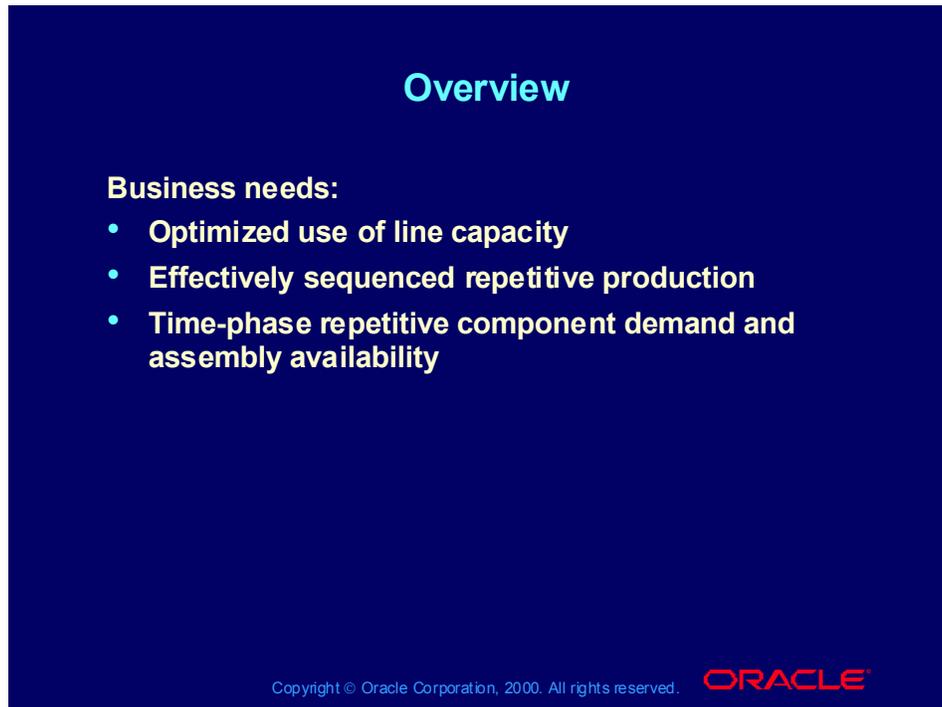
Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

### Lesson 1: Overview

- **Lesson 1: Overview**
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**



**Overview**

**Business needs:**

- **Optimized use of line capacity**
- **Effectively sequenced repetitive production**
- **Time-phase repetitive component demand and assembly availability**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### **Definition**

Repetitive line scheduling is a method of scheduling repetitive production on a line that considers hourly production rate, line start and stop times, assembly lead time, workday calendar, and optionally minimum and maximum line rates.

### Overview (continued)

#### Functionality:

- You can model your repetitive environment using line attributes, assembly and line attributes, and schedule attributes, all of which are used in repetitive line scheduling.
- The line start and stop times define repetitive resource shifts.
- You can use repetitive line scheduling when you define repetitive schedules manually and when you mass load them based on suggestions from Oracle Planning or other sources.

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

### Overview (continued)

- You can reschedule a repetitive schedule by changing quantities or dates in the Repetitive Schedules window.
- You can sequence repetitive production by using the Repetitive Line Report or outside sequencing applications.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 2: Concepts in Repetitive Line Scheduling

---

### Lesson 2: Concepts in Repetitive Line Scheduling

- Lesson 1: Overview
- **Lesson 2: Concepts in repetitive line scheduling**
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Elements of Repetitive Line Scheduling

---

Element	Description
Minimum rate	The minimum number of completed assemblies a production line can produce per hour.
Maximum rate	The maximum number of completed assemblies a production line can produce per hour.
Line lead time	The time required to complete the first assembly on a production line - from the first manufacturing operation to completion into inventory. Simply called lead time in this section.
Hourly production rate	The rate at which the production line can assemble items.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Concepts in Repetitive Line Scheduling

- Lead time and hourly production rate are not formally related. The two are independent in the system.
- If you physically speed up your production line, so that it takes less time to produce each assembly, you should lower the line's lead time. If this change in speed also results in more assemblies being completed per hour, you should also increase your hourly production rate.
- Two assemblies on the same line can have the same lead time but different hourly production rates.

## Repetitive Line Scheduling Elements (continued)

---

Element	Description
Line start time	The time a production line starts running every day. The line start time is used to schedule repetitive schedules on a line.
Line stop time	The time a production line stops running every day. The line stop time is used to schedule repetitive schedules on a line.
Daily line capacity	The daily production rate of assemblies on a production line. This is equal to the hourly production rate times the line production hours.
Daily rate	The number of completed assemblies a repetitive schedule plans to produce per day. Also known as a production rate.
Repetitive processing days	The number of days you plan to work on a repetitive schedule, from the first unit start date to the last unit start date.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Example

To schedule your repetitive production, you need to put all the elements together.

Assume that:

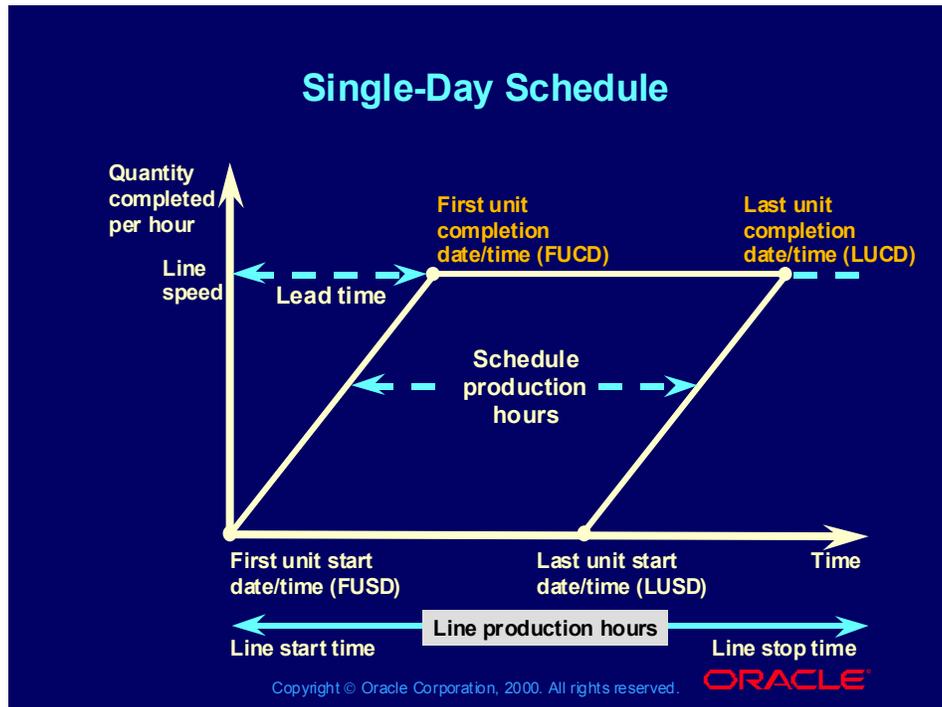
- For a particular assembly on a production line, lead time = 1 hour
- Hourly production rate = 10 assemblies per hour
- Demand is 101 assemblies for that day
- Line start time = 8 a.m.
- Line stop time = 8 p.m.
- Given this information:

1 If work starts at 8 a.m., when will the first assembly be completed?

The first assembly will be completed in 1 hour (lead time)—at 9 a.m.

2 When will the second unit be completed?

The hourly production rate is 10 assemblies per hour; therefore, one assembly is completed every 6 minutes. The second unit will be completed at 9:06 a.m.



#### Example (continued)

- 3 How long after the first unit is completed will the last (101st) assembly be completed?

The hourly production rate is 10 assemblies per hour; therefore it takes 10 hours to complete 100 assemblies from the time you completed the first. Your last assembly will be completed at 7 p.m.

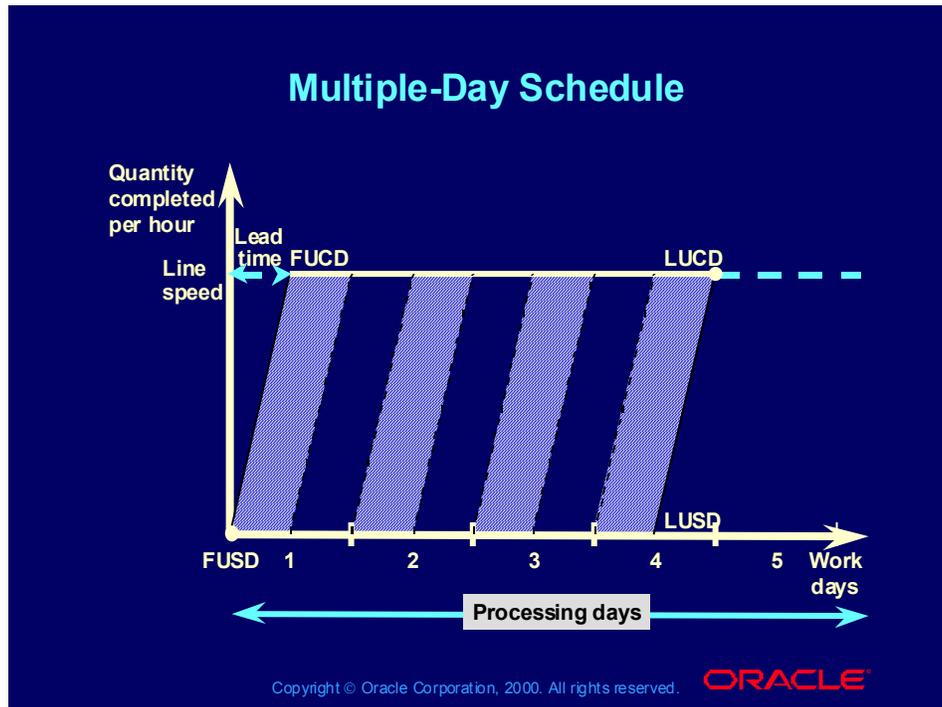
- 4 How long does it take to build 101 assemblies?

From the first unit start time at 8 a.m. to the last completion unit time at 7 p.m., it takes 11 hours to build 101 assemblies. That is equal to the lead time (1 hour) plus the number of assemblies left to build after the first, divided by the hourly production rate (100/10).

**Note:** The top horizontal line indicates the constant hourly production rate that you defined for the line for this assembly.

In this slide, schedule production hours = quantity per day/hourly production rate.

The faster the hourly production rate, the shorter the schedule. The greater the quantity per day, the longer the schedule.



### Schedule

You can run a schedule for several days.

Each shaded area represents the quantity produced (the daily rate) in a day.

The unshaded area represents idle time for this assembly on this line. Other assemblies may be running on the line at this time, or the line may be truly idle.

The total quantity for the schedule is processing days times daily rate—the sum of all the shaded areas.

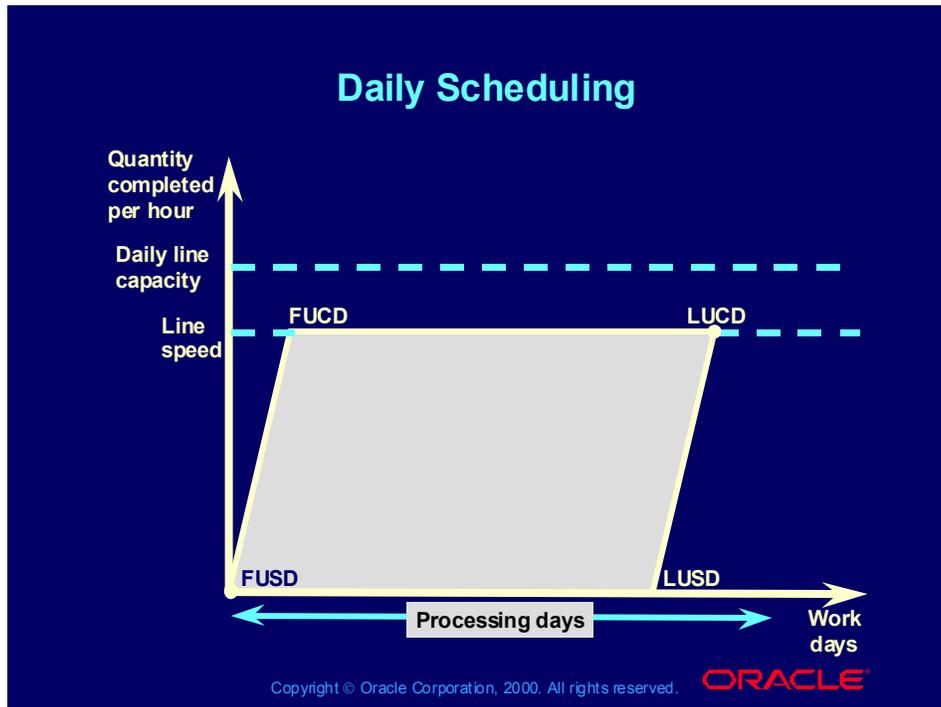
### Example

You can run a schedule for several days. Assume that:

- For a particular assembly on a production line, lead time = 1 hour.
- Hourly production rate = 10 assemblies per hour.
- Demand is 100 assemblies for that date.
- Line start time = 8 a.m. and line stop time = 8 p.m.
- You want to run the assembly on the line with these parameters for four days.

Given this information:

- You would run the same schedule for four days.
- With Oracle Work in Process, you can define this as a repetitive schedule, with processing days = 4, daily rate = 100, and total quantity = 400.



### Graphical Representation

If you are mostly concerned with daily rate, processing days, and total quantity, rather than hourly rates, production hours, and minute-by-minute line sequencing, you can use a simpler graphical representation.

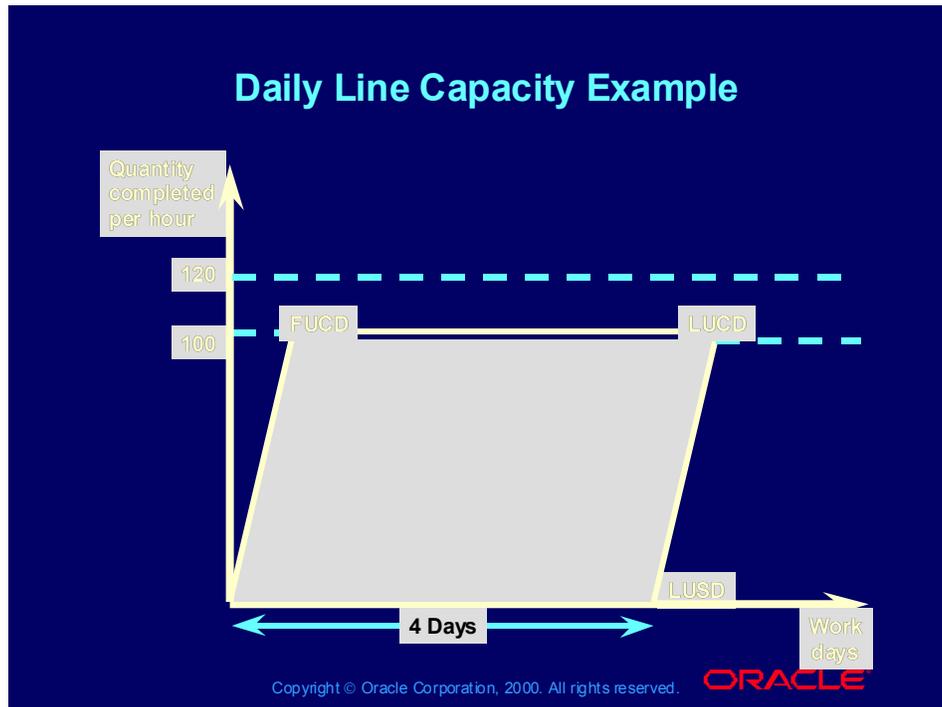
In this model the total quantity produced is equal to the area of the parallelogram.

Idle time or time producing other assemblies on the line in this model could be represented as the upward continuation of the parallelogram.

Daily line capacity = hourly production rate \* line production hours.

## Daily Line Capacity Example

---



### Formula

Daily line capacity = hourly production rate \* line production hours.

### Example

Where hourly production rate = 10, and line production hours = 12 (from 8:00am to 8:00pm), the daily line capacity = 120 (10 \* 12).

**Note:** Although the daily line capacity is 120, the line is only producing the daily demand of 100.

## Review Question

---

### Review Question

**Repetitive processing days: the number of days you plan to work on a repetitive schedule, from the first unit start date to the last unit completion date.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Answer to Review Question

---

### Answer to Review Question

**Repetitive processing days: the number of days you plan to work on a repetitive schedule, from the first unit start date to the last unit completion date.**

- True
- **False**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 3: Combined Assembly and Line Attributes

---

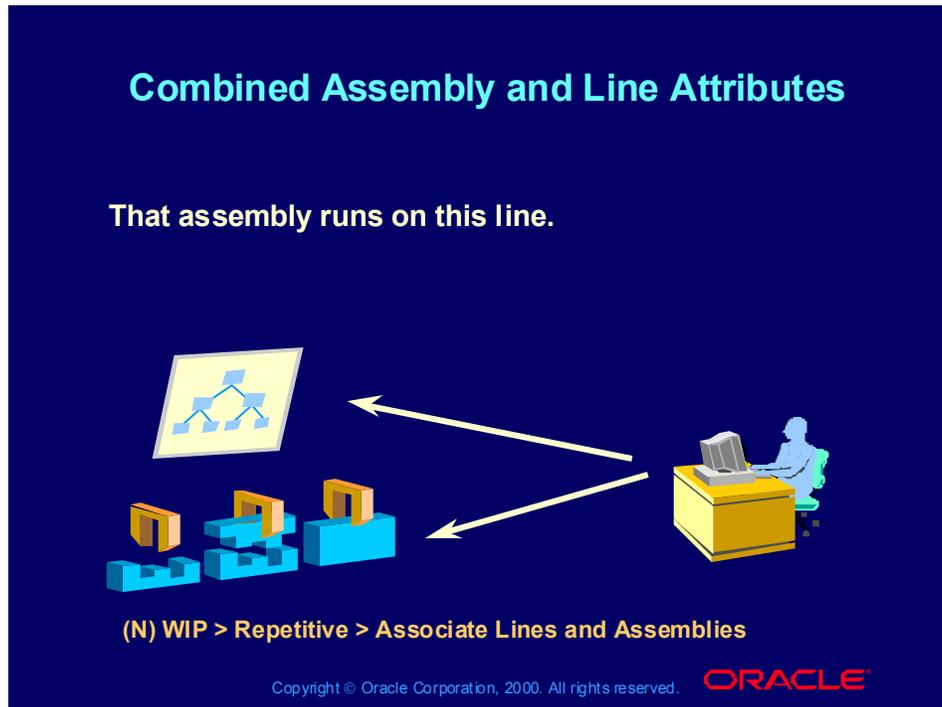
### Lesson 3: Combined Assembly and Line Attributes

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- **Lesson 3: Combined assembly and line attributes**
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Combined Assembly and Line Attributes

---



### Combined Line Attributes and Assembly

(Help) Oracle Manufacturing Applications > Oracle Work in Process > Repetitive Manufacturing > Associating Lines and Assemblies

You can enter an alternate routing to use for lead-time calculations for routing-based lines.

The hourly production rate determines how fast each line can produce this assembly. The maximum hourly rate that you defined for the line serves as the default and upper limit for the hourly production rate of any assembly running on this line. You can override this rate by entering a new one, but not to exceed the maximum.

**Note:** Oracle Work in Process does not enforce a minimum rate restriction, partly because it does not currently check the line capacity when setting hourly production rate. It is possible that the line is building several assemblies at the same time and that the total production rate for all assemblies does exceed the minimum rate, even if the speed of one individual assembly does not.

**Note:** The maximum rate restriction also restricts only the hourly production rate of each individual assembly on one line. It is possible that the line is building several assemblies and that the hourly production rate for each does not exceed the maximum rate, but the sum of all the hourly production rates on the line does.

## Review Question

---

### Review Question

**Oracle Work in Process enforces a minimum rate restriction so that it can check the line capacity when setting an hourly production rate.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

## Answer to Review Question

---

### Answer to Review Question

**Oracle Work in Process enforces a minimum rate restriction so that it can check the line capacity when setting an hourly production rate.**

- True
- **False**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 4: Production Lines in Repetitive Production

---

### Lesson 4: Production Lines in Repetitive Production

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- **Lesson 4: Production lines in repetitive production**
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

# Production Lines in Repetitive Production

---

**Production Lines in Repetitive Production**

You can set up repetitive line scheduling using the Production Lines window.



minimum	100	start	07:00:00
maximum	140	stop	15:30:00

(N) WIP > Setup > Production Lines

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Production Line Attributes

(Help) Oracle Manufacturing Applications > Oracle Work in Process > Repetitive Manufacturing > Setting Up

You use the minimum and maximum rates to model your production line's hourly capacity.

You use the line's start and stop time instead of a shift calendar to schedule resources. Resource capacity is assumed to be available while the line is operating. Any shift information, if defined, is ignored.

For fixed lead-time lines, you use the predefined lead time to schedule all production on the line.

For routing-based lead-time lines, you use the detailed scheduling algorithm with a lead-time lot size of 1 to find the lead time based on the routing of the assembly running on the line.

## Repetitive Schedule Quantities

---

### Repetitive Schedule Quantities

**With repetitive line scheduling, you:**

- Use daily quantity to specify how many assemblies per day to build

**Note:** A warning message is displayed if you try to define a schedule whose rate exceeds the maximum daily rate of the line, but it does not prevent you from defining such a schedule.

- Use days to specify for how many days you want to produce this assembly at the specified rate
- Can use the line minimum and maximum daily rate as a guideline for the daily quantity of schedule

**(N) WIP > Repetitive > Repetitive Schedules**

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

(Help) Oracle Manufacturing Applications > Oracle Work in Process >  
Repetitive Manufacturing > Creating Repetitive Schedules >  
Overview of Building Repetitive Schedules

## Repetitive Schedule Dates and Times

---

### Repetitive Schedule Dates and Times

**You:**

- Can specify to the minute the start and completion dates and times of your repetitive schedule
- Can schedule to the minute each day the operations and resources of the schedule.
- Can schedule all the requirements based on operation dates each day of the schedule.
- Must enter either the first unit start date and time and the first unit completion date and time, or the last unit start date and time and the last unit completion date and time, in order to define the lead time for a routingless assembly running on a routing-based line.

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

**Note:**

You can use the start and completion dates and times as a guideline for when to produce your schedule.

You can view the operation start and end dates and times and the associated resources of a repetitive schedule in the View Operations window.

### Repetitive Schedule Routing

**You can enter a routing revision date to specify which revision of the routing to use for scheduling, or select a valid routing revision from a drop-down list.**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Review Question

---

### Review Question

**For routing-based lead-time lines, you use the detailed scheduling algorithm with a lot size of:**

- 1
- 10
- 100

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

## Answer to Review Question

---

### Answer to Review Question

For routing-based lead-time lines, you use the detailed scheduling algorithm with a lot size of:

- 1
- 10
- 100

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE®

## Lesson 5: Scheduling Repetitive Schedules

---

### Lesson 5: Scheduling Repetitive Schedules

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- **Lesson 5: Scheduling repetitive schedules**
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

## Mass Loading Repetitive Schedules

---

### Mass Loading Repetitive Schedules

You can define repetitive schedules based on suggestions from Oracle Planning or any other planning system.

- You can load repetitive schedules from Oracle Planning using the Planner Workbench.
- Oracle Planning uses lead-time offset to calculate the start date you see in the Planner Workbench.
- Oracle Work in Process uses repetitive line scheduling to calculate the exact start date you see in the Repetitive Schedules window after the load.

(N) Material Planning > MRP or MPS > Workbench

(N) WIP > Repetitive > Repetitive Schedules

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

(Help) Oracle Master Scheduling/MRP > Planner Workbench

(Help) Oracle Manufacturing Applications > Oracle Work in Process >

Repetitive Manufacturing > Creating Repetitive Schedules >

Overview of Building Repetitive Schedules

## Mass Loading Status

---

### Mass Loading Status

**Schedules are loaded into Oracle Work in Process with a status of Pending—Mass Loaded.**

**Reasons for this status:**

- **MRP does not consider existing schedules. Implementing these schedules without looking at existing ones can result in overproduction.**
- **MRP-suggested schedules may overlap with existing schedules, which is not allowed.**

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

### **Some Rules**

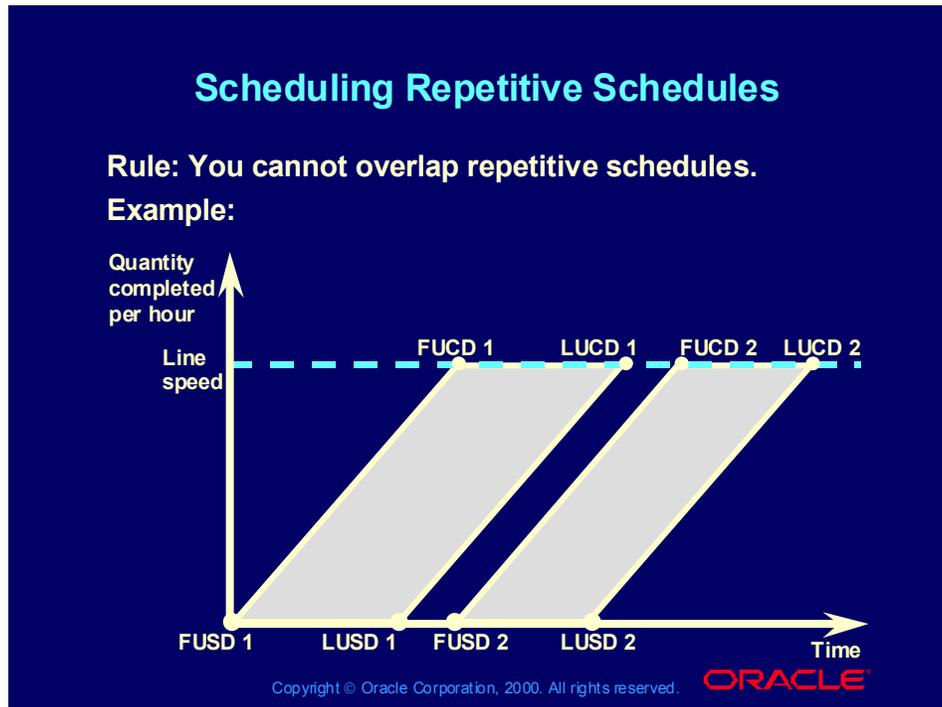
- Repetitive schedules building the same assembly on the same line may not overlap.
- The first unit start date and time of a schedule must never precede the last unit start date and time of the previous schedule.

### Importing Repetitive Schedules

- You can load repetitive schedules from any outside planning system.
- Oracle Work in Process uses repetitive line scheduling to schedule the repetitive schedules being loaded in.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Scheduling Repetitive Schedules



### Example

The above schedules do not overlap because FUSD2 is greater than LUSD1. This means that even if there is idle time on the line on any given day of the schedule, you cannot define another schedule for the same assembly on this line.

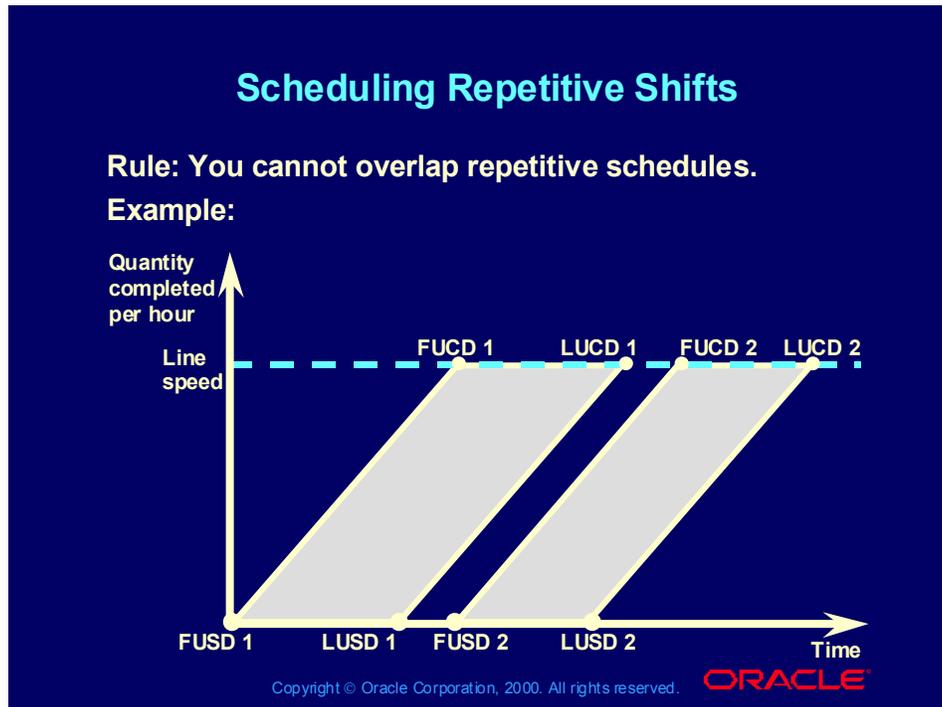
Not allowing overlap enables Oracle Work in Process to perform flow charging for repetitive schedules. (Flow charging is when you charge the repetitive assembly and line rather than a specific job. It is based on FIFO. If more than one schedule is running at the same time, you do not know to which schedule transaction charges need to be allocated.)

### Overlapping

It is helpful to think of the assembly moving down the production line, so that even though the first unit of the second schedule starts before the first schedule is completed, the units of the first schedule are far enough down the line for the second schedule to begin.

## Scheduling Repetitive Shifts

---



### Consideration

The overlap restriction means that you cannot schedule repetitive shifts using multiple-day schedules.

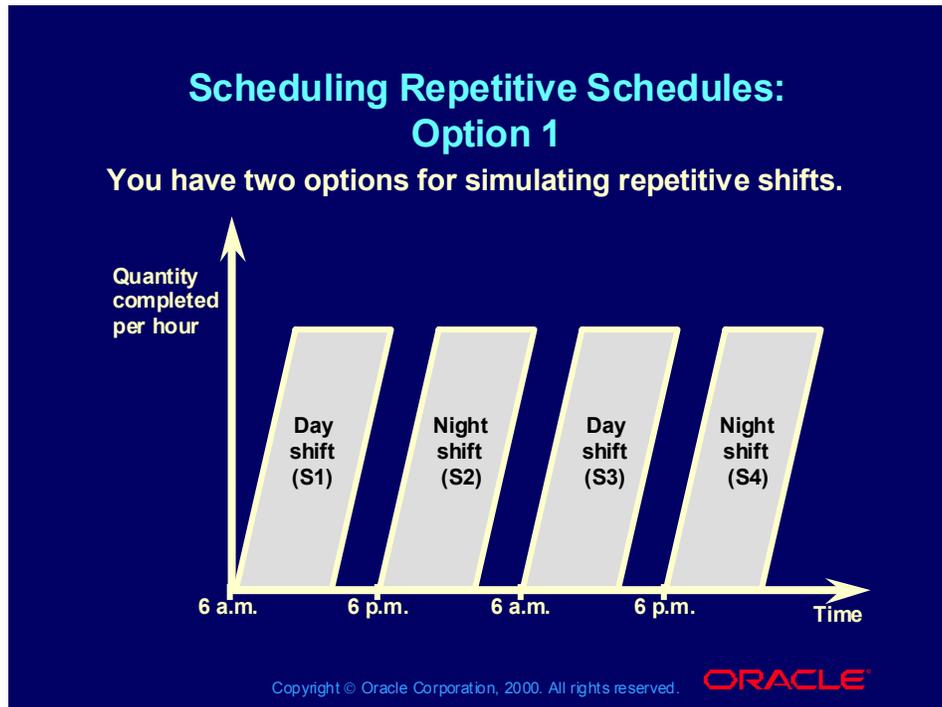
For example, you cannot define two schedules to run concurrently for several days, one to represent the day shift, the other to represent the night shift.

If you have a need to separate the schedules in a way that matches the repetitive production shifts, you need to create repetitive schedules that align with, or simulate, these shifts. For instance, you may want to simulate the repetitive shifts if you are building one bill revision during the day and a different bill revision at night.

You may also want to simulate repetitive shifts if you want to keep separate performance data for each shift.

## Scheduling Repetitive Schedules: Option 1

---

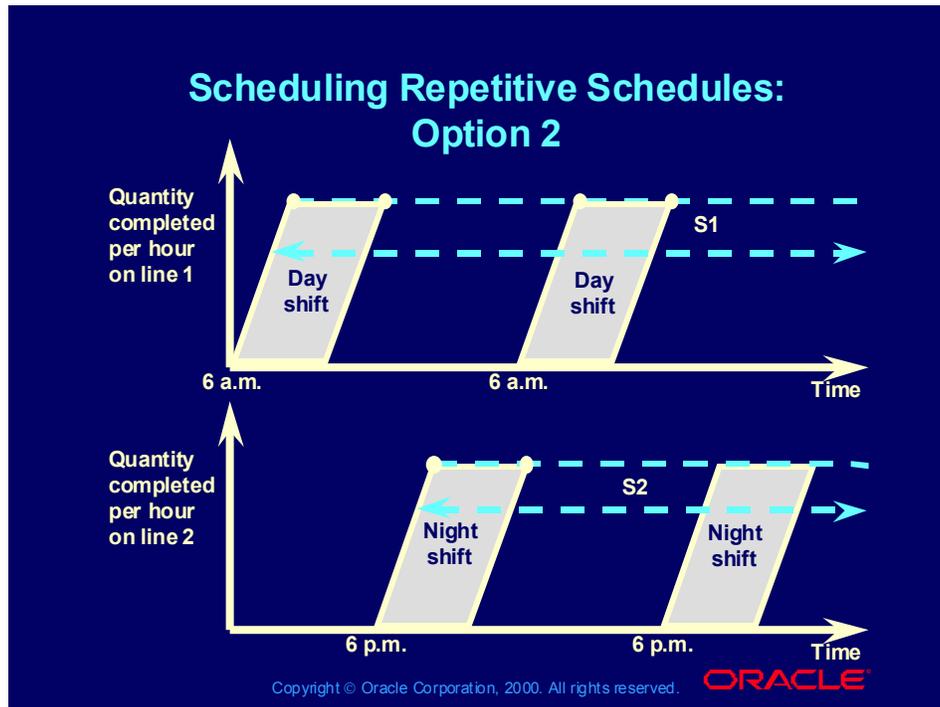


### Option 1

- Define two or more schedules on the same line for each day of production. S1, S2, S3, and S4 in the diagram are separate repetitive schedules.
- This option uses the same line and assembly for all schedules, so that you can still do flow charging on transactions.
- With this option you have to define as many schedules as you have shifts for each day of production.
- With this option you cannot separate costs, hourly production rates, performance, and so on, across shifts.

## Scheduling Repetitive Schedules: Option 2

---



### Option 2

- Define your production line as two lines in the system and set your line start and stop times equal to the shift start and stop times. Define one schedule on each line to last for several days.  
S1 and S2 are the only two schedules you have to define using this option.
- If you use this option, you cannot do flow charging on transactions, because you are producing on a different line.
- You cannot consolidate your costs across different lines.
- You can support performance evaluations, hourly production rate differences, and cost differences across shifts.

## Review Question

---

### Review Question

If more than one schedule is running at the same time, you can still know to which schedule transaction charges can be allocated.

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Answer to Review Question

---

### Answer to Review Question

If more than one schedule is running at the same time, you can still know to which schedule transaction charges can be allocated.

- True
- **False**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Review Question

---

### Review Question

**Option 1 allows you to define two or more schedules on the same line for each day of production.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

## Answer to Review Question

---

### Answer to Review Question

**Option 1 allows you to define two or more schedules on the same line for each day of production.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

## Review Question

---

### Review Question

**Which of the following statements is/are not true?**

- 1 You can load repetitive schedules from a 3rd party system.**
- 2 You should load schedules from MRP in an unreleased status.**
- 3 When importing repetitive schedules, the first unit start date and time must never precede the last unit start date and time of the previous schedule.**
- 4 You should never overlap schedules when building the same assembly on separate lines.**

Copyright © Oracle Corporation, 2000. All rights reserved.

**ORACLE**

## Answer to Review Question

---

### Answer to Review Question

**Which of the following statements is/are not true?**

- 1 You can load repetitive schedules from a 3rd party system.
- 2 You should load schedules from MRP in an unreleased status.**
- 3 When importing repetitive schedules, the first unit start date and time must never precede the last unit start date and time of the previous schedule.
- 4 You should never overlap schedules when building the same assembly on separate lines.**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 6: Rescheduling Repetitive Schedules

---

### Lesson 6: Rescheduling Repetitive Schedules

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- **Lesson 6: Rescheduling repetitive schedules**
- Lesson 7: Sequencing a repetitive production
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Benefits of Rescheduling

By rescheduling your repetitive schedules, you can respond quickly to:

- New information
- Temporary increases or decreases in demand
- Changes in priority
- Temporary increases or decreases in capacity
- MRP recommendations

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE®

## Changing Schedule Attributes

---

### Changing Schedule Attributes

You can change:

- Schedule dates and times to reflect priority changes
- Schedule processing days to lengthen or shorten the schedule
- Schedule daily rate to increase or decrease your daily production
- Schedule total quantity to increase or decrease your total production. This implies a change in processing days and daily rate.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

### Consideration

To deal with permanent changes in demand or capacity, you should change line or assembly and line attributes.

For example, you could change your line start and stop times or change the hourly production rate for that assembly.

Changes in this type of setup information are not automatically reflected in existing schedules.

## Changing Dates

---

### Changing Dates

- You can reschedule your repetitive production using the Repetitive Schedules window.
- You can change any of the four date and time sets to reflect changes in your production schedule, and the other dates are calculated automatically.
- To change dates for assemblies without routings on a routing-based line, you must provide either the first unit start date and the first unit completion date or the last unit start date and the last unit completion date.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

### Example

Suppose you have to meet customer demand by December 15, or sooner if possible.

You originally backward-scheduled your schedule using the December 15 date as your last unit completion date. Your calculated first unit start date was December 1. Today is November 25, and you are ready to start your production on this schedule.

You can update the first unit start date of the schedule to November 25, and inform the customer that the assemblies will be ready on the date that is calculated as the new last unit completion date.

## Changing Processing Days

---

### Changing Processing Days

- You can change your processing days to reflect a lengthening or shortening of your schedule.
- The total quantity is automatically adjusted to be the daily rate multiplied by the new processing days.
- Repetitive schedule dates are recalculated around whichever date you choose to reflect the change in processing days.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

#### **Example (continued)**

Assuming the same scenario as in the previous example, suppose the schedule was defined to run for 10 processing days with a daily rate of 1,500 units, for a total quantity of 15,000 units. Now you get another order for 1,500 units of the same assembly, due on December 31.

If the line on which your current schedule has adequate capacity to keep producing the assembly past the completion date of the first schedule, you can increase the processing days on the schedule to 20. The new total quantity is calculated as  $20 * 1,500 = 30,000$  units, which will meet the total demand.

## Changing the Daily Rate

---

### Changing the Daily Rate

- To change the quantity of the assembly produced on your line daily, you can change the daily rate of your schedule.
- A change in the daily rate results in the recalculation of the total quantity of the schedule and the adjustment of the schedule requirements.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

#### **Example (continued)**

Suppose that instead of the new demand being due two weeks after the original demand, it is due at the same time.

The production line is currently working only on the original schedule, and it is idle for half of its production hours.

You can define the schedule to run at a rate of 3,000 units daily to meet the demand of 30,000 assemblies in 10 processing days.

## Changing the Total Quantity

---

### Changing the Total Quantity

- Changing the total schedule quantity results in a change in processing days by default.
- You can change the daily rate directly if you also want to change the quantity produced per day.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

#### **Note**

Since Oracle Planning does not consider existing schedules in its netting calculations, it does not recommend rescheduling changes for repetitive schedules.

You cannot manually change individual operation dates for repetitive schedules.

## Review Question

---

### Review Question

**You must provide either the first unit start and completion dates or the last unit start and completion dates when changing dates for assemblies without routings on a routing-based line.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Answer to Review Question

---

### Answer to Review Question

**You must provide either the first unit start and completion dates or the last unit start and completion dates when changing dates for assemblies without routings on a routing-based line.**

- True
- False

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 7: Sequencing a Repetitive Production

---

### Lesson 7: Sequencing a Repetitive Production

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- **Lesson 7: Sequencing a repetitive production**
- Lesson 8: Summary

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Sequencing Your Production Meaningfully

---

### Sequencing Your Production Meaningfully

You can plan your repetitive production to meet your goals.

- You can maximize efficiency by sequencing your production to cut down on setup and teardown costs.
- You can sequence your production to maintain the right product mix in inventory.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

#### Options

- You can run several assemblies on the same line.
- You can sequence the schedules for the different assemblies on the line by date and time.

## Example of Sequencing

---

### Example of Sequencing

Suppose you want to make vanilla ice cream, chocolate chip ice cream, and chocolate chocolate chip ice cream on the same line at the same speed. The ice cream line runs from 8 a.m. to 5 p.m. every day. You want to maintain equal amounts of each in inventory.

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

### Sequencing of Repetitive Production

- You should define the ice cream flavors as different assemblies and associate them with your ice cream production line.
- Sequence them by date and time from the simplest, vanilla, to the most complex, chocolate chocolate chip.
- Define the vanilla schedule to start at 8 a.m., the chocolate chip schedule to start at 11 a.m., and the chocolate chocolate chip schedule to start at 2 p.m.
- **Consideration**
- The schedules in the example above can run on the same days for several processing days because they produce different assemblies. The overlap rule does not apply in this case.

## Repetitive Line Report

---

### Repetitive Line Report

You can use the repetitive line report to prioritize the schedules on a given line. You can view:

- All schedules defined on a line for any assemblies that you build on this line
- The date and quantity information of the schedules and prioritize your production accordingly
- Any mass-loaded schedules that reflect the newest production requirement information here.

(N) WIP > Report > Run WIP Reports (Repetitive Line Report)

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

(Help) Oracle Manufacturing Applications > Oracle Work in Process > Reports and Processes > Work in Process Reports > Repetitive Line Report

## Making Changes

---

### Making Changes

- You can use the Repetitive Schedules window to make necessary changes, such as moving a schedule start date forward or backward.
- You can use past start dates to signify high priority.

(N) WIP > Repetitive > Repetitive Schedules

Copyright © Oracle Corporation, 2000. All rights reserved.

ORACLE

(Help) Oracle Manufacturing Applications > Oracle Work in Process >  
Repetitive Manufacturing > Creating Repetitive Schedules >  
Overview of Building Repetitive Schedules

### Using Other Prioritizing Applications

**You can use the Job and Schedule Interface to load prioritized schedules from a source.**

- 1 Load the Job and Interface table from other applications.**
- 2 Move the schedules into WIP using Import Jobs and Schedules window.**
- 3 Adjust the schedules' statuses in the Repetitive Schedules window.**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Lesson 8: Summary

---

### Lesson 8: Summary

- Lesson 1: Overview
- Lesson 2: Concepts in repetitive line scheduling
- Lesson 3: Combined assembly and line attributes
- Lesson 4: Production lines in repetitive production
- Lesson 5: Scheduling repetitive schedules
- Lesson 6: Rescheduling repetitive schedules
- Lesson 7: Sequencing a repetitive production
- **Lesson 8: Summary**

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Summary

- You can model your repetitive environment using line attributes, assembly and line attributes, and schedule attributes, all of which are used in repetitive line scheduling.
- The line start and stop times define repetitive resource shifts.
- You can use repetitive line scheduling when you define repetitive schedules manually and when you mass load them based on suggestions from Oracle Planning or other sources.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

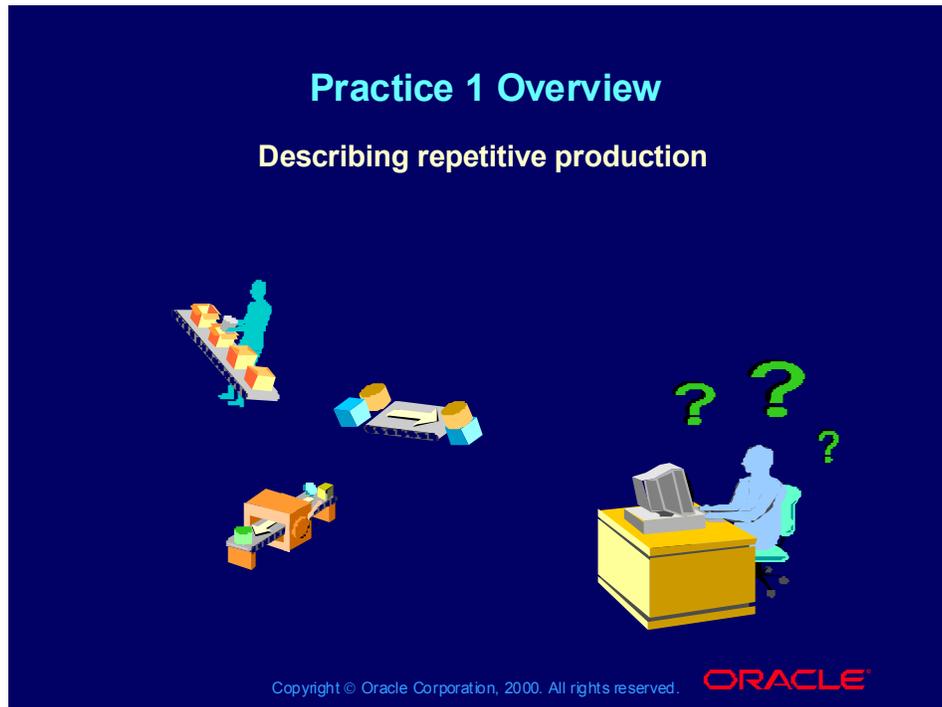
### Summary (continued)

- You can reschedule a repetitive schedule by changing quantities or dates in the Repetitive Schedules window.
- You can sequence repetitive production by using the Repetitive Line Report or outside sequencing applications.

Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

## Practice 1 Overview

---

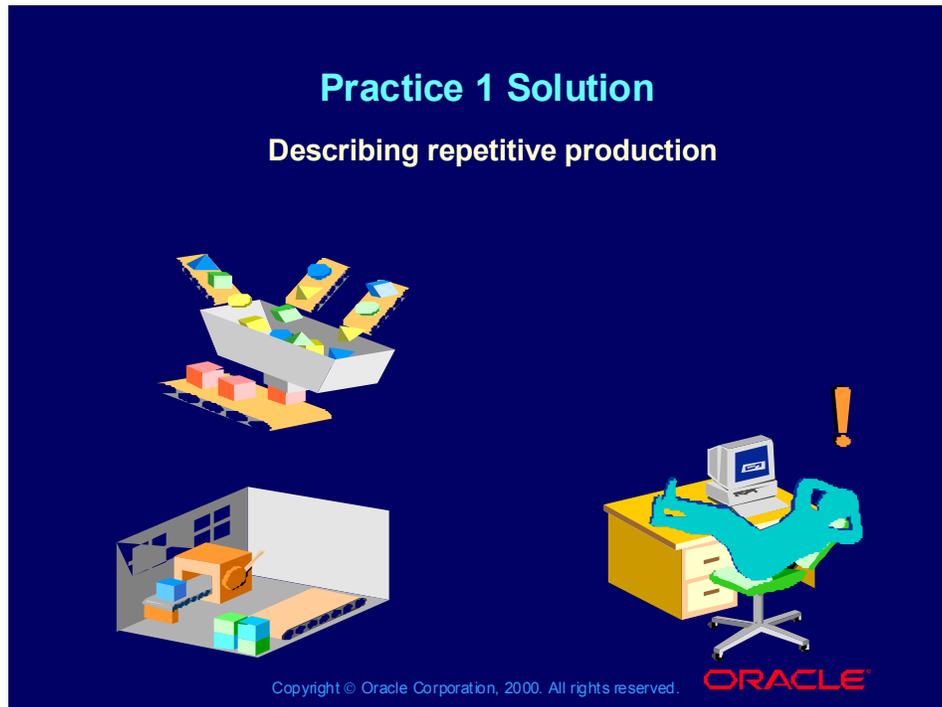


### Practice 1

1. Why are attributes, such as alternate bill and routing, accounting class, hourly production rate, and completion location, determined at the assembly/line level, rather than at the individual schedule level? Also, why is the hourly production rate not determined at the line level?
2. Under what circumstances would you want to use option 1 for simulating repetitive shifts (that is, defining one schedule per shift each day)? Under what circumstances would you want to use option 2 (that is, defining different lines)?

## Practice 1 Solution

---



### Practice 1

1. Why are attributes, such as alternate bill and routing, accounting class, hourly production rate, and completion location, determined at the assembly/line level, rather than at the individual schedule level? Also, why is the hourly production rate not determined at the line level?

**It is characteristic of repetitive manufacturing that these types of attributes are the same for many repetitive schedules. Defining these attributes at the assembly/line level makes defining schedules easier and faster.**

**Hourly rate is not determined at the line level because different assemblies may run down the same line at different speeds.**

2. Under what circumstances would you want to use option 1 for simulating repetitive shifts (that is, defining one schedule per shift each day)? Under what circumstances would you want to use option 2 (that is, defining different lines)?

**Option 1 has the disadvantage that you have to define many schedules. If you use the mass load functionality, this would not be a big problem.**

**You would also want to use option 1 if you have an obvious need to do flow charging - for example, if your first shift is likely to start some assemblies that would be completed by the next shift. In that case, you have to run on the same line in order to complete the assemblies in the second shift.**

**Option 2 would work only if you do not need to do flow charging - for example, if you can be sure that all transactions pertaining to a particular assembly will be completed before the next shift starts. If you have short lead times and sufficiently long breaks between shifts, this would be a viable option.**

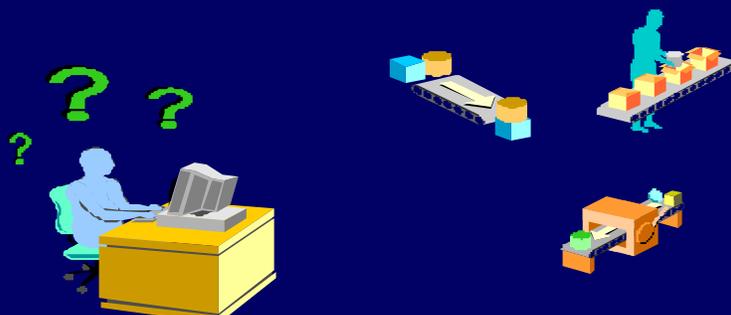
**Option 2 also separates the costing reporting of the shifts, which may or may not be desirable for your business.**

## Practice 2 Overview

---

**Practice 2 Overview**

**Instructions**  
You are a production manager at Vision. You want to build 12,000 Envoy base assemblies repetitively on line EnvBase1 in 12 days. There are no base assemblies in inventory.



Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Practice 2

1. What are the original daily rate, processing days, and total quantity of the schedule?

Suppose that on your second day of production, your customer inquires whether it would be possible to move shipment up by two days. You are in your second day of production, so this means that the customer needs the completed assemblies in another 8 days.

How would you update the schedule to reflect the new requirements?

2. What special considerations are warranted due to the fact that production has started? Under what circumstances would you not be able to meet the new demand?
3. Aside from updating the original schedule, what other possibilities might Vision consider?

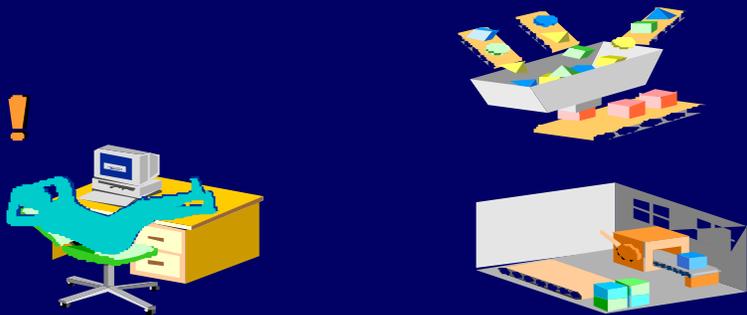
## Practice 2 Solution

---

**Practice 2 Solution**

**Instructions**

You are a production manager at Vision. You want to build 12,000 Envoy base assemblies repetitively on line EnvBase1 in 12 days. There are no base assemblies in inventory.



Copyright © Oracle Corporation, 2000. All rights reserved. **ORACLE**

### Practice 2

1. What are the original daily rate, processing days, and total quantity of the schedule?

**Daily rate = 1,000; processing days = 12; total quantity = 12,000**

Suppose that on your second day of production, your customer inquires whether it would be possible to move shipment up by two days. You are in your second day of production, so this means that the customer needs the completed assemblies in another 8 days.

How would you update the schedule to reflect the new requirements?

**The new processing days is 10, since you are in the second day of production and have 8 days left. To deliver 12,000 units in 10 days, update the daily rate to 1,200.**

2. What special considerations are warranted due to the fact that production has started? Under what circumstances would you not be able to meet the new demand?

**The fact that you started the schedule at a lower rate means that you are behind in your schedule. You have to find a way to catch up to your schedule if you want to make your deadline. In effect, you probably want to run your schedule at a daily rate higher than 1,200 to catch up.**

**You would not be able to meet the new demand if you were already operating at 100% capacity.**

3. Aside from updating the original schedule, what other possibilities might Vision consider?

**You could define a schedule to build the same assembly on another line at a rate of 200 a day for 10 days, and shorten your original schedule to 10 days. Your total quantity would add up to 12,000.**

**You could run production day 2 out at the old daily rate of 1,000, shorten the schedule to 2 processing days, and define a new schedule with a rate of 1,250 for the remaining 8 days. This would formalize the need to build more than 1,200 units a day to catch up.**

**Note that 1,000 is your daily line capacity, you would have to increase the line speed or add production hours to be able to produce more assemblies per day.**