Accounting Information Systems 2nd edition Richardson Solutions Manual

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CHAPTER 2

Accountants as Business Analysts

Brief Topical Outline

A. Changing Roles of Accountants in Business (PowerPoints 2-3 - 2-6)

1. Basic stewardship, reporting, and auditing functions
2. Increasingly active role in strategic management roles
3. Rapid changes in technology increase availability of data
4. Entry-level accountants must understand how business delivers value to customers and stakeholders

B. Business Process Documentation (PowerPoints 2-7 – 2-12)

1. Definitions (PowerPoint 2-7)
   a) Business Process
   b) Business Analysis
   c) Business Model
   d) Documentation
2. Purposes of Documentation (PowerPoints 2-8 - 2-11)
3. Value of Business Models (PowerPoint 2-12)

C. Types of Business Models (PowerPoint 2-13)

1. Activity Models
2. Structure Models

D. Background and Purpose of Activity Models (PowerPoints 2-14 – 2-16)

E. Business Process Modeling Notation (BPMN) (PowerPoints 2-17 – 2-27)

1. Building Blocks for BPMN Diagrams (PowerPoints 2-18 – 2-21)
2. Example of Business Process Diagram (PowerPoint 2-22)
3. Identifying Participants in Business Process Diagrams (PowerPoints 2-23 – 2-24)
4. Messages in BPMN (PowerPoints 2-25 – 2-26)
5. Best Practices in Preparing BPMN Diagrams (PowerPoint 2-27)

F. Appendix A: Flowcharts

1. Basic building blocks
2. Example
3. Additional symbols
4. Showing Responsibility
5. Showing Opportunity

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G. Appendix B: Data Flow Diagrams

1. Introduction
2. Basic elements of Data Flow Diagrams
3. Example
4. Best practices

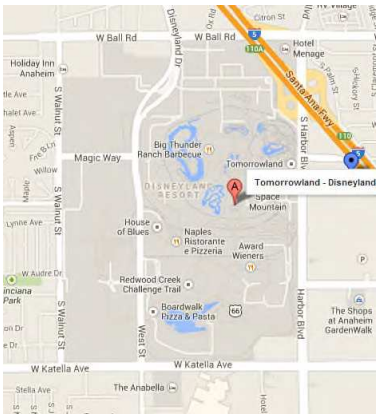
Comments and Observations

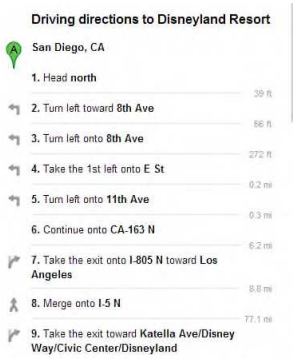
This chapter starts the business processing modeling/business analyst material that will continue through chapters 3, 4, 5, 6, 7 and 8. It sets the context and the importance of business process modeling to accountants.

I find that most students recognize the various roles that accountants play in business from other accounting courses. For this course, it is important to emphasize the various business management support roles and how developing business analysis skills can help prepare them for those roles.

I also find that most students have some familiarity with business process documentation—especially the use of documentation to train new workers—but they have limited knowledge of business process models, business rules, organization charts or strategic plans. This provides an opportunity to tie together accountants' roles, business documentation, and the importance of developing business analysis skills. To help enterprises optimize business processes, the accountant needs to understand those processes. Business process documentation helps establish process requirements as well as describe the way those processes are currently performed. Business analysis then involves gathering and articulating the fundamental requirements for those processes, validating those requirements, and evaluating improvements to the processes to optimize performance. This helps students understand that business models play an important role in business analysis and leads into the discussion of activity models.

The text explores two basic types of models, structure models and activity models. At this point, a simple illustration helps explain the difference between the two types of models. Structure models are like a map and activity models are like the directions for traveling.





The text uses the Business Process Modeling Notation for activity models, but the students should understand that BPMN is similar in most respects to flowcharting. BPMN emphasizes the importance of events that trigger subsequent action (somewhat like business events trigger accounting activity). As I review the building blocks for BPMN activity models, I like to point out that activity modeling is a skill

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that takes practice to develop.

The introduction to BPMN now includes a discussion of the token concept. A token is created by a start event and must continue through the model until it is consumed by an end event. I discuss this concept here and then revisit it in chapters 5, 6, and 7. The token concept also helps describe what the various gateway types do. For example, an exclusive gateway only directs the token, but a parallel gateway creates new tokens for the various paths exiting the gateway and consumes tokens entering the merging gateway.

Additions to this chapter include event and task types, repeating activities, and data objects (and data stores). Again, these topics are introduced here and revisited in chapters 5, 6, and 7. The data objects help tie the BPMN models to UML class models, since the data objects should reflect UML classes or combinations of classes that occur in many documents.

Suggested Team Exercise

After reviewing the basic building blocks, I find it useful to break the students into small groups and have one student describe some activity that the other student will them model using BPMN. For example, they could describe how they got to class on that day, how they bought lunch at a fast food restaurant, how they checked their email before class, etc. You can then select a few groups to put their diagrams on the board. That allows you to discuss the results of the exercise and also begin stressing some of the BPMN best practices, such as using verb phrases, identifying the start and end of the process, avoiding distracting detail, and achieving a clear picture of the activities.

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Chapter 2: Accountants as Business Analysts

Multiple Choice Questions

1. e
2. d
3. e
4. e
5. e
6. b
7. d
8. e
9. e
10. c
11. c
12. e
13. d
14. c
15. b
16. a
17. b
18. e
19. d
20. a
21. e
22. e

Discussion Questions

1. The answers will vary according to the student's background, but it is likely that they will feel best prepared to use technology and less prepared to design, manage, and evaluate technology.

2. Managing regulatory compliance would involve collection and maintenance of a wide variety of information. First, organizations would have to collect requirement information. Then, they would have collect process information to identify where process activities must comply with regulations. Finally, they would have ongoing collection of process performance data to ensure continued compliance and reporting.

3. BPMN activity diagrams support process documentation, process evaluation, and process improvement. Thus, BPMN diagrams would document the finance and accounting processes to support employee training. An accurate documentation would support an evaluation of process inefficiencies and potential process improvements including applications of technology, as well as a review of internal controls over the process and identification of potential weaknesses.

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4. Student responses will vary depending on their experience, but most will mention training, SOX compliance, regulatory compliance, identifying and collecting process performance information, aiding audits, and so on.

5. Process modeling is iterative. The analyst will model the process and then confirm his/her model with process participants. The confirmation process would likely raise questions about completeness.

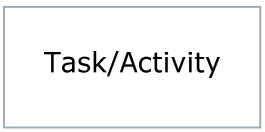
6. The use of pools and lanes help establish responsibility. It would be hard to enforce responsibility where multiple departments are involved. Additionally, the assignment process helps define tasks/activities at an appropriate level of detail that allows the models to be used for training, process change, performance management, etc.

7. Exclusive gateways show distinct choices, such as when you select one option among multiple alternatives. Inclusive gateways allow selection of one or more options, such as ordering both an entrée and an appetizer or just an entrée. Parallel gateways take all possible options, such as when dining at a restaurant that charges one price for the meal that includes an appetizer, main course, beverage, and dessert.

8. When the process experiences a delay such as described, the best way to model that is through the use of an intermediate event, such as an intermediate message (catching) event.

9. Processes that start with a timer event could be time to prepare financial reports, time to pay taxes, time to attend class, etc.

10. BPMN diagrams serve similar purposes to flowcharts. The following table compares basic symbols and shows the similarities. The BPMN symbols have more capability to handle events and the Gateways are more flexible that the flowchart decision symbol. The extended list of symbols in the chapter shows that many flowchart symbols are closely tied to specific and outdated data processing methods, whereas the BPMN symbols are independent of the technology.

Element	BPMN Symbol	Flowchart Symbol
Events/ Start and End		
Activities		

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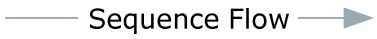
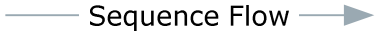
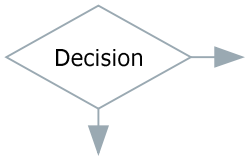
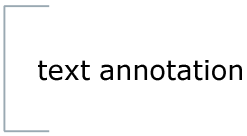
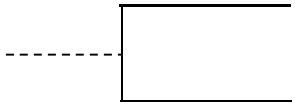
Sequence Flows		
Gateways/ Decisions		
Annotations		

Comparing BPMN to data flow diagrams shows that the models are very different. Data flow diagrams do not have start, end, or intermediate event symbols. They do, however, clearly show the flow of data in a process or processes, where the BPMN diagram more clearly shows the sequence of activities.

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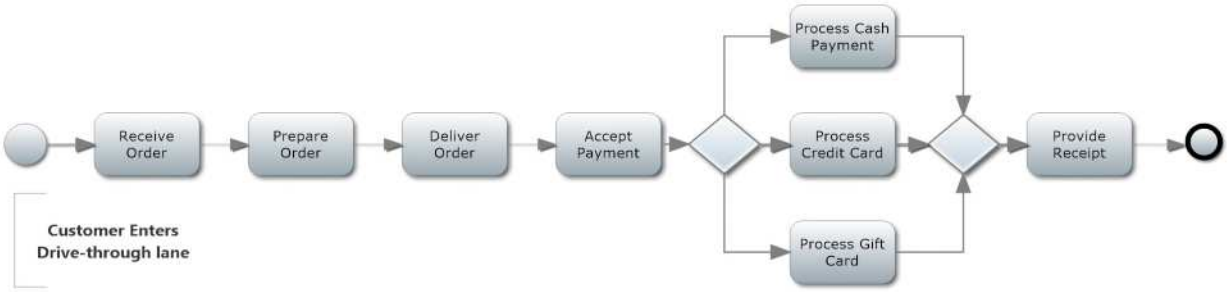
Problems

(Note – Problems with "Connect" in parentheses below are available for assignment within Connect. The Connect-based solutions for all Problems can be found in the following section beginning on Page 11.)

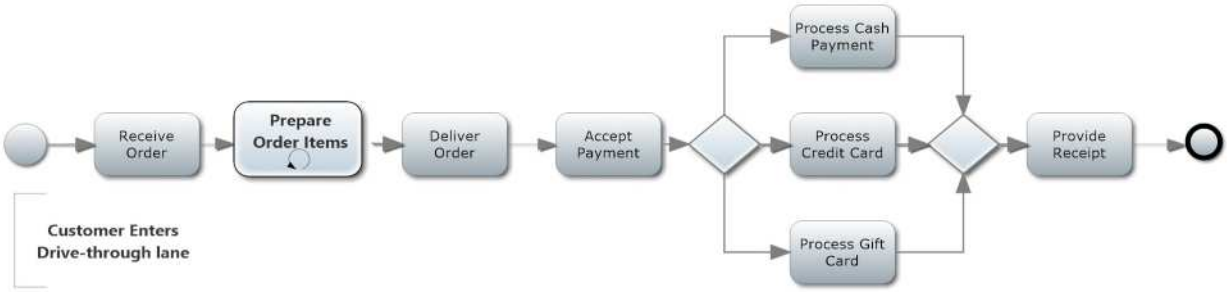
1. **(Connect)** Solutions for Parts a to d are below:

a. Solution should look similar to the following model:



(Note that "review menu" is a customer task and would not be modeled in the Starbucks pool.)

b. Solution should look similar to the following model. The looping task could also involve accepting payments, e.g., the customer pays partly by gift card and remainder by cash.



c. Same solution as problem 1, but adding the possibility that coffee will take 5 minutes to brew.

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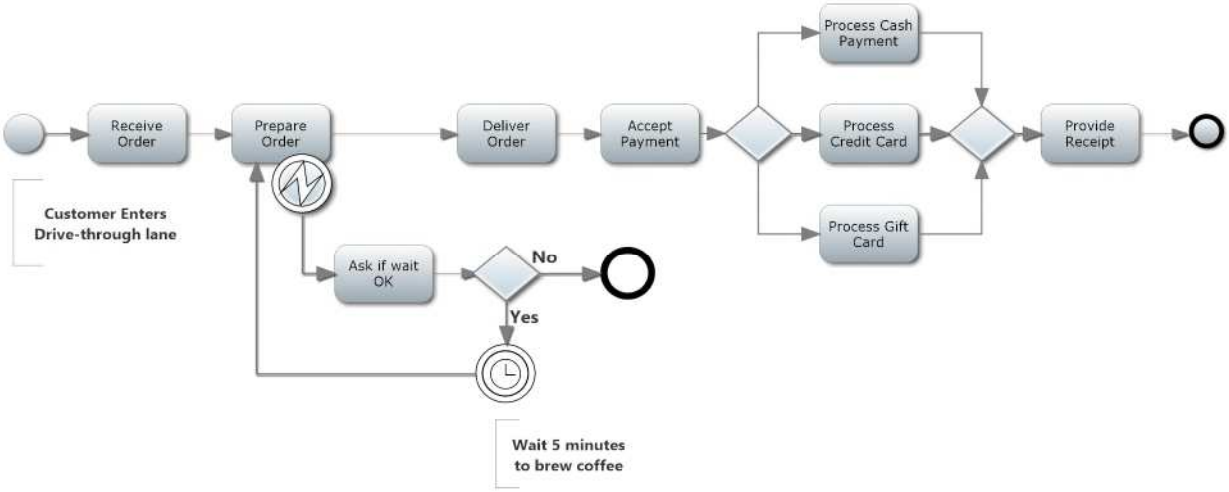
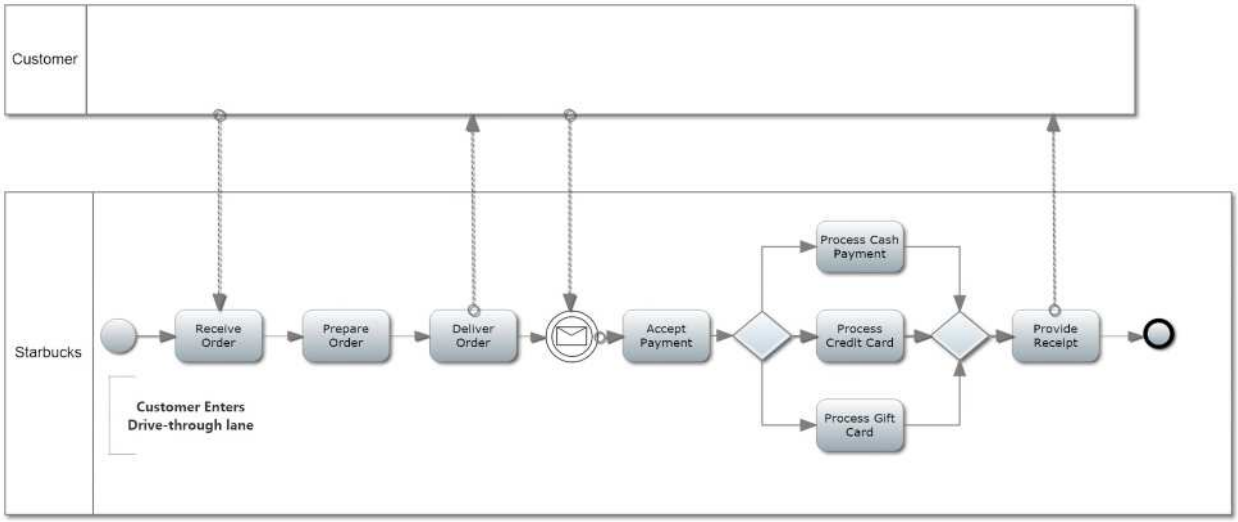


d. Same as problem 1, but including two pools, message flows, and an intermediate message event. This solution only includes one intermediate message event, but there could be a message event receiving and sending (catching and throwing) all message flows.



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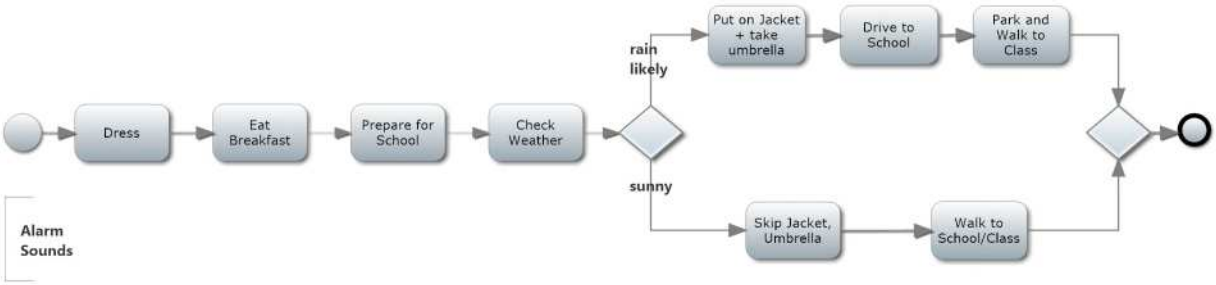
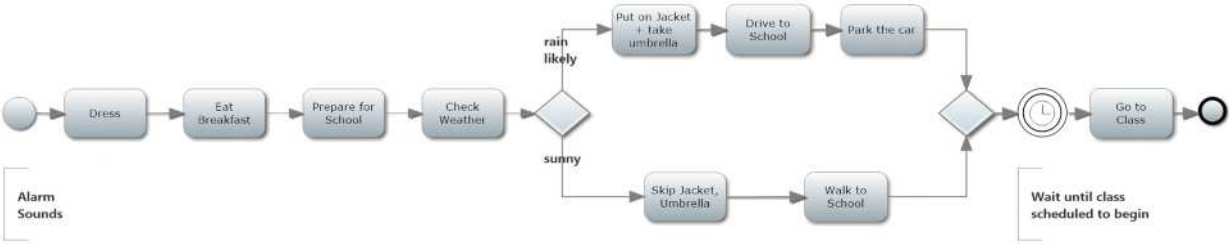
2. **(Connect)** Solutions for Parts a to c are shown below:

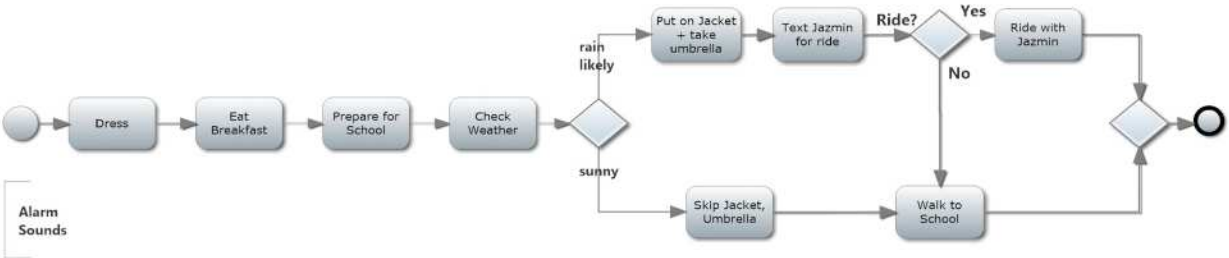
a. Solution should look similar to the following model:



b. Same as Part a, but add an intermediate timer event to indicate the wait between arriving at school and going to class.



c. Same as Part a, but instead of driving, Larry texts Jazmin for a ride to school. If she can give him a ride, he rides to school with her. If not, he walks to school.



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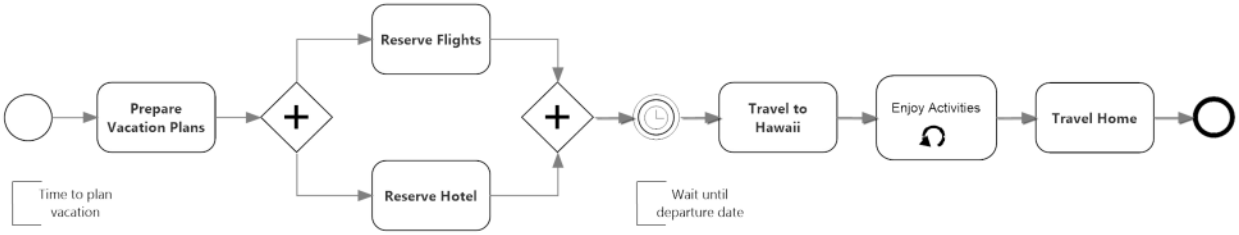
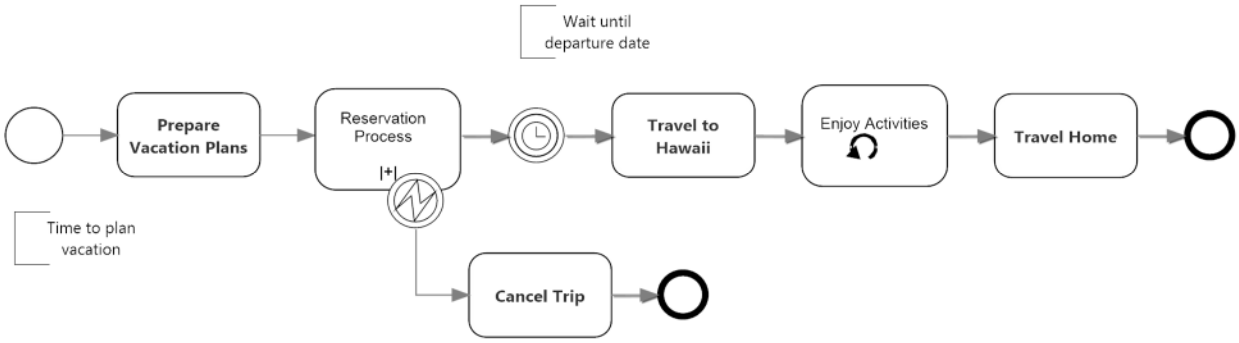
3. **(Connect)** Solutions for Parts a and b are shown below:

   a. Yannis plans a vacation to Hawaii.



a. Same as Part a, but assuming that Yannis is having trouble staying within his budget. He tries alternate dates for flight and hotel reservations and cancels his trip if they are not acceptable. In this solution, the reservation process is presented as a collapsed subprocess. The details of the reservations subprocess, including testing alternate dates, could be modeled separately.



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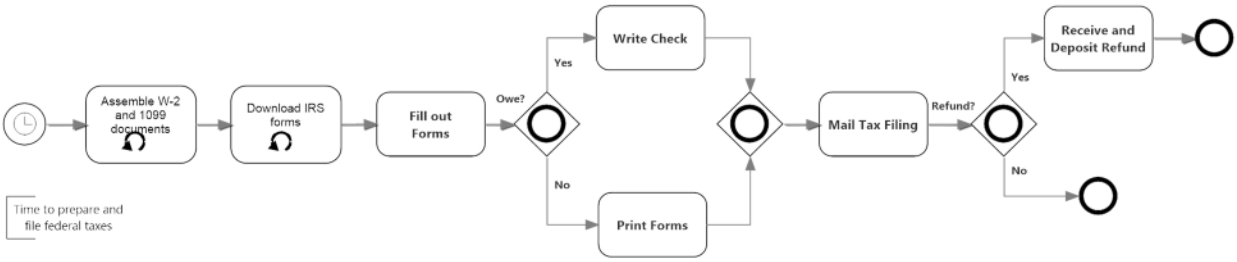
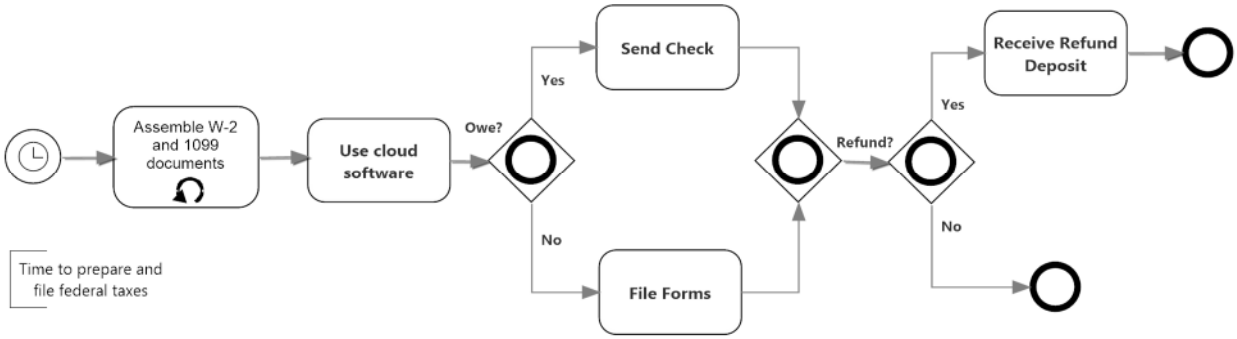
4. **(Connect)** Solutions for Parts a and b are shown below:

   a. Time to prepare and file your federal income taxes. Note that tasks could be represented as looping (for multiple forms or documents).



a. Same as Part a, but instead of manual preparation, you use an online tax system to prepare and submit your tax forms. The refund, if any, is sent directly to your bank.



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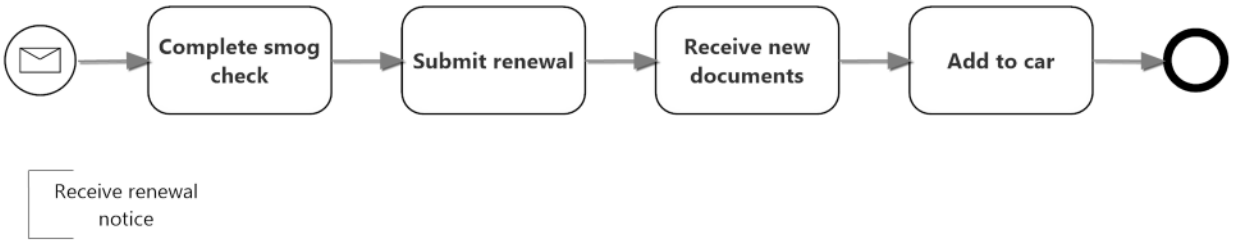
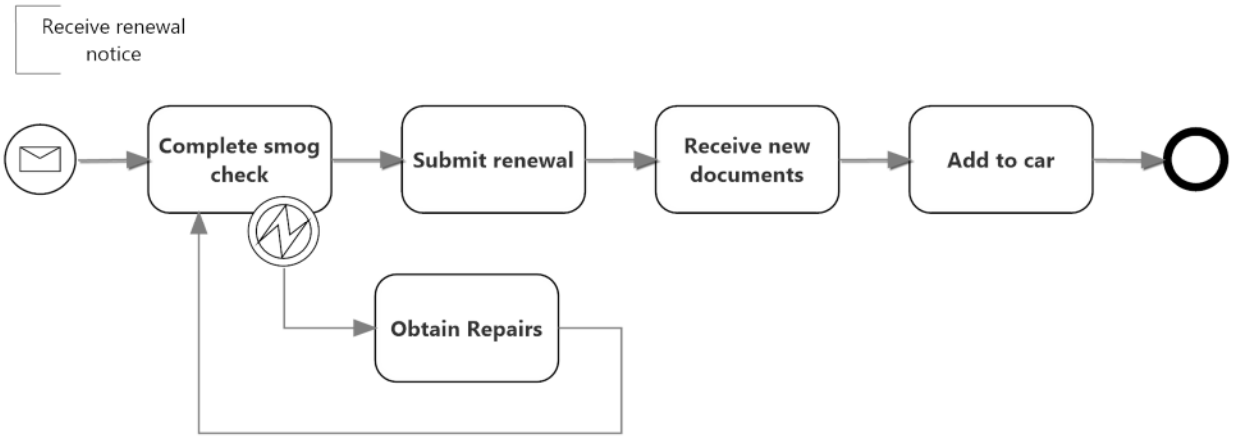
5. **(Connect)** Solutions for Parts a to c are shown below:

   a. Heide renews her automobile registration after completing smog check. Simple initial process.



   b. Same as Part a, but now the automobile fails the smog check and needs repairs from the dealer to pass. Note that you could use gateways to model the error condition.



   c. Same as Part a, but now the diagram uses data objects to represent the renewal forms received from the state, the smog check certificate, and the subsequent registration.

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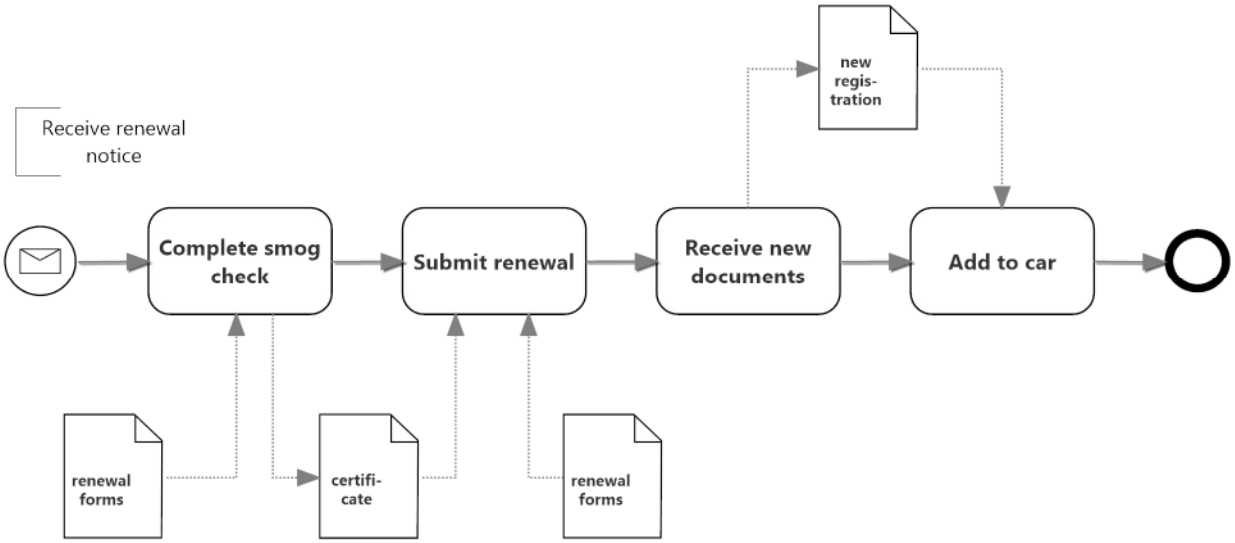

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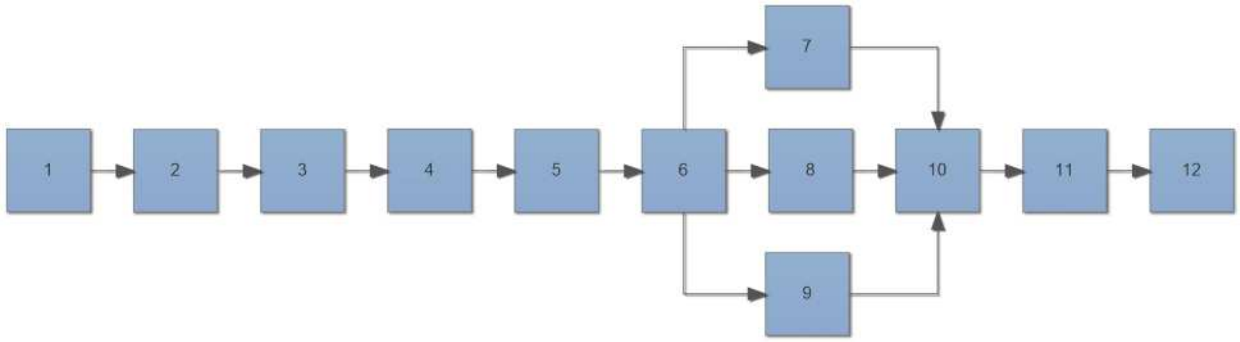
Problems – Solutions for Connect

Problem 1

Part A

Assume that you will complete your model with 12 elements in the sequence shown below.



1. Which BPMN symbol should replace block 1 above to start the process?
    1. **A circle with a thin solid perimeter**
    2. A rectangle with rounded corners
    3. A diamond
    4. A circle with a thick solid perimeter
    5. A rectangle with sharp corners
2. The name for the symbol that you selected to replace block 1 in the process is which of the following?
    1. A task
    2. A gateway
    3. An end event
    4. **A start event**
    5. An intermediate event
3. Which BPMN symbol should replace block 2 above in the process?
    1. A circle with a thin solid perimeter
    2. **A rectangle with rounded corners**
    3. A diamond
    4. A circle with a thick solid perimeter
    5. A rectangle with sharp corners
4. The name for the symbol that you selected to replace block 2 is which of the following?
    1. **A task or activity**
    2. A gateway
    3. An end event
    4. A start event
    5. An intermediate event
5. Which of the following is the best label or name to replace the number 2?
    1. Order received

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   2. Prepare order
   3. Receive order
   4. Accept payment
   5. None of these
6. Which of the following is the best label to replace the number 3?
   1. Order received
   2. Prepare order
   3. Receive order
   4. Accept payment
   5. None of these
7. Which of the following is the best label to replace the number 4?
   1. Order received
   2. Prepare order
   3. Order is delivered
   4. Deliver order
   5. None of these
8. Which of the following is the best label to replace the number 5?
   1. Order received
   2. Prepare order
   3. Receive order
   4. Accept payment
   5. None of these
9. After number 5, the process branches to process the type of payment. Which of the following BPMN symbols should then replace block 6 in the process?
   1. A circle with a thin solid perimeter
   2. A rectangle with rounded corners
   3. A diamond
   4. A circle with a thick solid perimeter
   5. A rectangle with sharp corners
10. The name for the symbol that you selected to replace block 6 in the process is which of the following?
   1. A task
   2. A gateway
   3. An end event
   4. A start event
   5. An intermediate event
11. Which of the following is the best label to replace the number 6?
   1. Order received
   2. Receipt is provided
   3. Provide receipt
   4. Accept payment
   5. None of these
12. Assume that blocks 7, 8, and 9 represent 3 options for processing payments. After that branching, the process then merges again in block 10. Which of the following is the name of the BPMN symbol that should replace block 10?
   1. A task
   2. A gateway
   3. An end event

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4. A start event
5. An intermediate event

13. Which of the following is the best label to replace the number 11?
    1. Receipt is provided
    2. Prepare order
    3. Receive order
    4. **Provide receipt**
    5. None of these
14. Which of the following is the name of the BPMN symbol that should replace block 12?
    1. A task
    2. A gateway
    3. **An end event**
    4. A start event
    5. An intermediate event
15. Which of these describes the BPMN symbol that should replace block 12 above to end the process?
    1. A circle with a thin solid perimeter
    2. A rectangle with rounded corners
    3. A circle with a double line perimeter
    4. **A circle with a thick solid perimeter**
    5. A rectangle with sharp corners

Part B

Assume the diagram above provides a high-level view of the process.

a. Which of the following is used to represent a looping task?
    1. Use a gateway before and after the task
    2. Create a collapsed subprocess
    3. **Add a circular arrow to the symbol**
    4. Add an intermediate timer event
    5. None of these

b. Assume that the Starbucks barista performs multiple preparation tasks to prepare the order. Which of the following diagrams best shows the looping task?

1.

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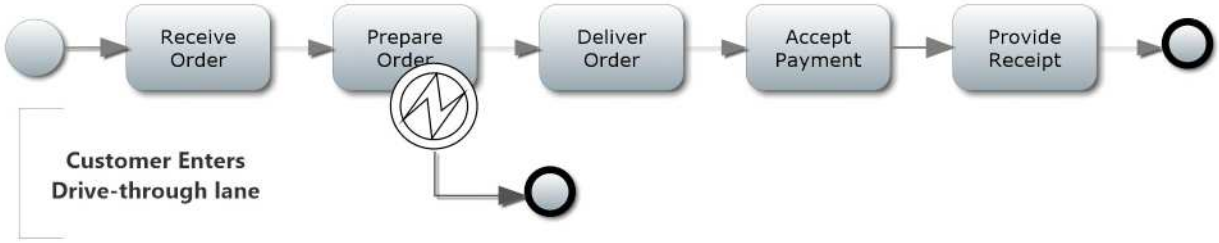
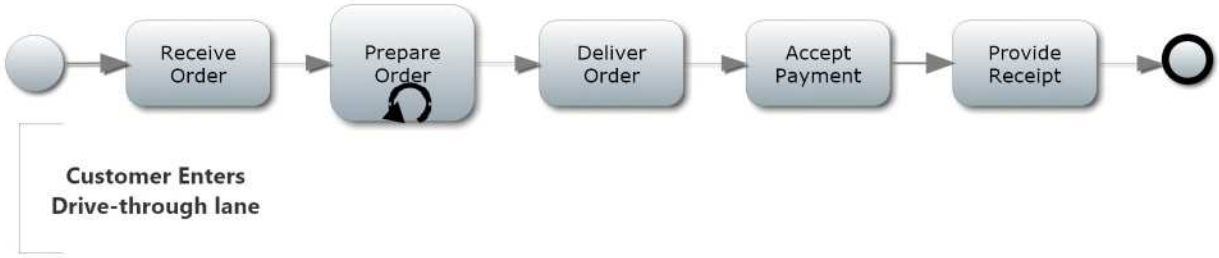
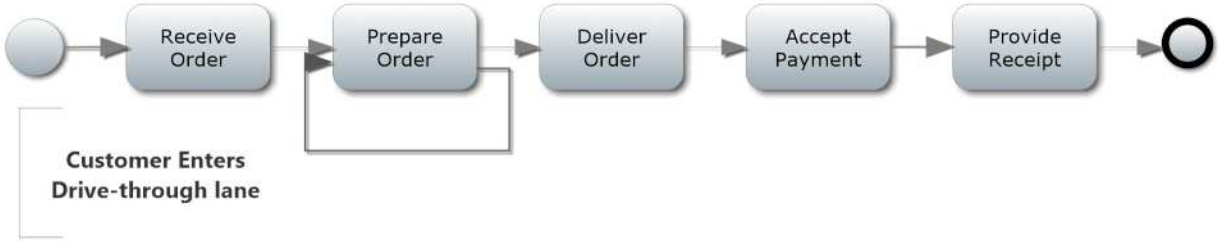


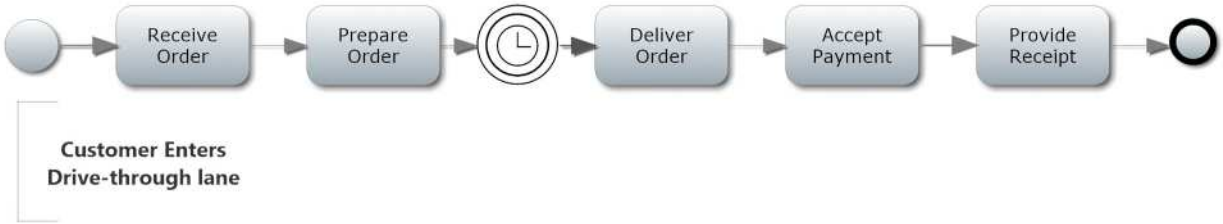
2.



3.



4.



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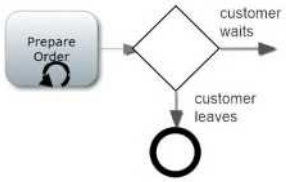
Part C

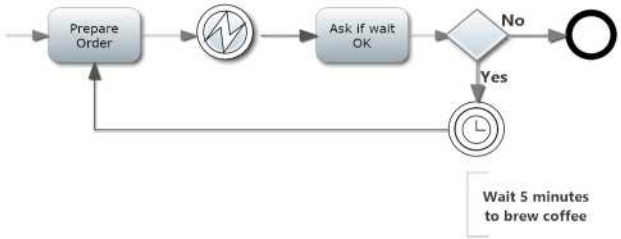
a. Which of the following is used to represent an intermediate error event?
   a. Place the intermediate error symbol on the perimeter of the task
   b. Use a gateway after testing whether coffee is ready
   c. Add a circular arrow to the symbol showing that the process repeats
   d. Add an intermediate timer event showing that the process is delayed
   e. None of these

b. Which of the following partial diagrams best models the described features?

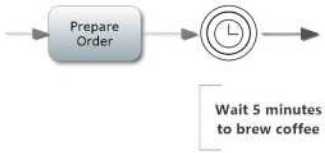
1.



2.



3.



4.

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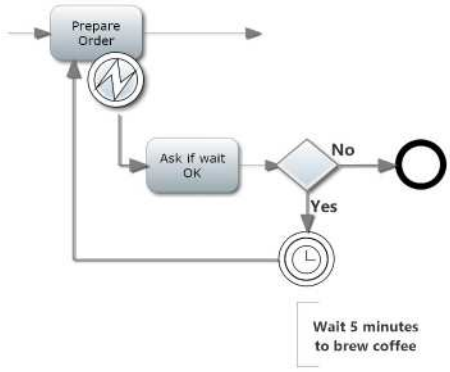

Part D

a. Pools represent participants in a process. Which of the following is the best name for the pool representing the external participant?
   1. Starbucks
   2. Baristas
   3. **Customers**
   4. Drive-through lane
   5. None of these
b. Which of the following is most likely to be a name of a message flow coming into the Starbucks pool?
   1. **Customer Order**
   2. Delivered Order
   3. Answers to Customer Questions
   4. Customer Receipt
   5. None of these
c. Models often show the pool for the external participants as opaque. What are the advantages of this?
   1. Focuses on the message flows and activities for the internal participant
   2. Ignores activities in the external participant pool that are not relevant
   3. Reduces the complexity of the model
   4. Focuses on controllable process activities
   5. **All of these**
d. Intermediate message events can be catching or throwing. The events catch incoming message flows and throw outgoing message flows. Which of the following message flows could connect to an intermediate catching event in this process?
   1. Delivered products
   2. **Customer payments**
   3. Customer receipt
   4. Answers to customer questions
   5. None of these
e. Intermediate message events can be catching or throwing. The events catch incoming message flows and throw outgoing message flows. Which of the following message flows could connect to an intermediate throwing event in this process?

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1. Customer order
2. Customer payments
3. **Customer receipt**
4. Answers to customer questions
5. None of these

f. Which of the following is required if you include any tasks or other BPMN elements in the Customers pool?
   1. **The sequence flow in the Customers pool must flow continuously from the start event to end events**.
   2. The message flows still connect to the edge of the Customers pool regardless of whether or not the pool is opaque.
   3. You do not need to show message flows if you include activities in the Customers pool.
   4. The Starbucks pool can be opaque if you include the activities in the Customers pool and the message flows.
   5. None of these.

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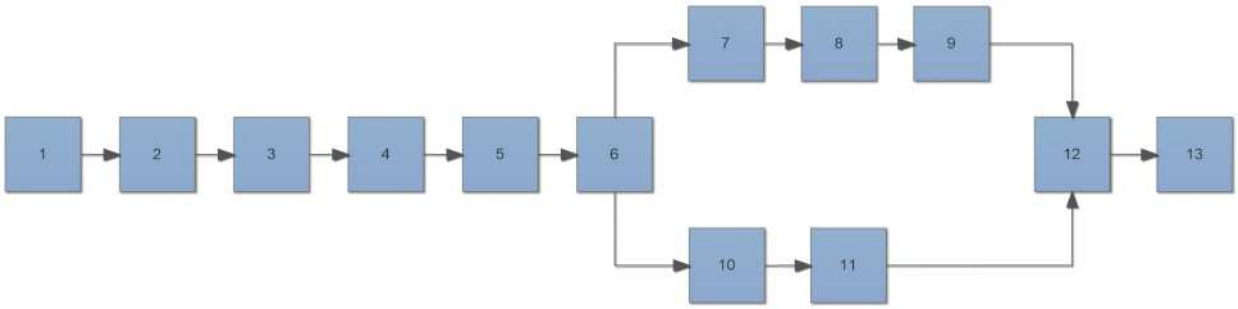
Problem 2

Part A

Assume that you will complete your model with 13 elements in the sequence shown above.



1. Assume that block 1 is the start event that begins this process. From the problem description, what is the trigger for the start of the process?
    a. Time to go to school
    b. Alarm sounds
    c. The weather report
    d. A weekday starts
    e. None of these
2. What is the name of the BPMN symbol that should replace block 1?
    a. A task
    b. A gateway
    c. An end event
    d. A start event
    e. An intermediate event
3. What is the name of the BPMN symbol that should replace block 2?
    a. A task
    b. A gateway
    c. An end event
    d. A start event
    e. An intermediate event
4. Which of the following is the best label for block 2?
    a. Clothes are put on
    b. Get dressed
    c. Eat breakfast
    d. Prepare for school
    e. None of these

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5. Assume that block 5 represents the "check weather" task. Then, block 6 represents where the process branches depending on weather. What kind of gateway should be used to replace block 6?
    a. Inclusive gateway
    b. Exclusive gateway
    c. Parallel gateway
    d. Conditional gateway
    e. None of these
6. Assume that block 7 represents a task labeled "put on jacket and take umbrella," and block 8 represents a task labeled "drive to school." Which of the following is the best label for block 9?
    a. Take of jacket
    b. Park and walk to class
    c. Drive to class
    d. Walk to class
    e. None of these
7. Which of the following is the name of the BPMN symbol that should replace block 12 to show that the two sequence options merge?
    a. A task
    b. A gateway
    c. An end event
    d. A start event
    e. An intermediate event
16. Which of the following describes the BPMN symbol that replaces block 12?
    1. A circle with a thin solid perimeter
    2. A rectangle with rounded corners
    3. A circle with a double line perimeter
    4. A circle with a thick solid perimeter
    5. A diamond
17. Which of the following is the name of the BPMN symbol that should replace block 13?
    1. A task
    2. A gateway
    3. An end event
    4. A start event
    5. An intermediate event

Part B

Consider the same narrative as shown in the beginning, but add an intermediate timer event to indicate the wait between arriving at school and going to class when the class is scheduled to start.

a. Which of the following best describes the purpose of an intermediate timer event?
    1. Causes the process flow to branch
    2. Allows the process flows to merge
    3. Delays process flow until a specified time or specified duration
    4. Starts a process at a specified time
    5. None of these

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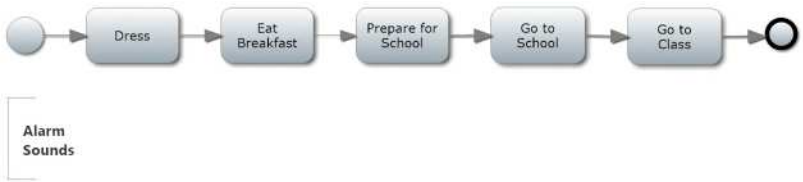
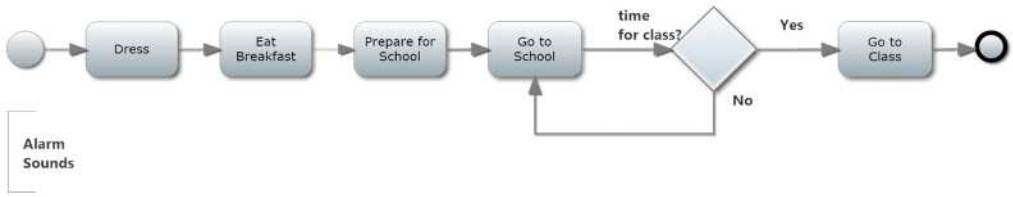
b. Consider the following high-level model of this process. Where would you insert the intermediate timer event?



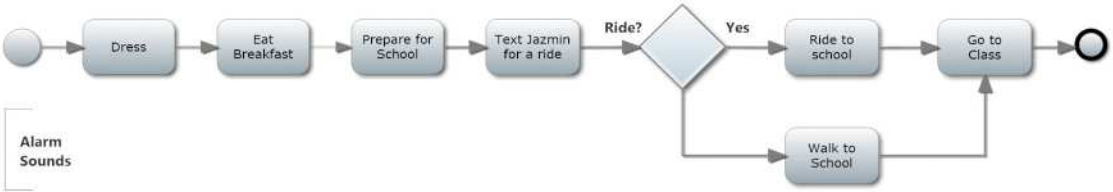
1. Between the start event and the dress task.
2. Between prepare for school tasks and go to school task.
3. **Between go to school task and go to class task**.
4. Between go to class task and end event.
5. None of these.

c. Consider the following model. Why isn't this an acceptable equivalent to the one shown in b above with an intermediate timer event?



1. The flow loops back to going to school and you are already there.
2. Gateways don't develop information, they direct flow based on information from the previous task/activity.
3. The loop doesn't delay the flow until a specified time.
4. **All of these are reasons why model c is not equivalent to model b**.

Part C



a. Assume the diagram above correctly summarizes the activity in question. Why is the following diagram not equivalent to the diagram above?

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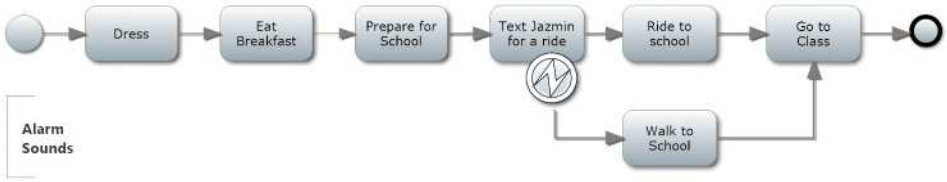

1. **This diagram assumes that an error occurs when Jazmin will not give you a ride**.
2. This diagram assumes that you don't always text to ask for a ride.
3. This diagram assumes Jazmin's car will not break down.
4. This diagram assumes that you do not want to walk to school.
5. None of these explains why the two diagrams are not equivalent.

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Problem 3

Part A

For each step in the diagram from the beginning, enter the appropriate symbol and label. If two events can occur at the same time, enter information for both. The 1st, 4th, and 10th steps have been entered for examples.

Step	Symbol(s)	Label(s)
1	a.	x
2	**d**	**b**
3	**g**	**x**
4	d and d	c and d
5	**g**	**x**
6	**i**	**x**
7	**d**	**e**
8	**h**	**a**
9	**d**	**f**
10	b	x

<u>Select from the following symbols</u>

a. Start Event
b. End Event
c. Intermediate Event
d. Task
e. Exclusive Gateway
f. Inclusive Gateway
g. Parallel Gateway
h. Looping Task
i. Intermediate Timer Event
j. Intermediate Error Event

<u>Select from the following labels</u>

a. Enjoy vacation activities
b. Prepare vacation plans
c. Reserve Flights
d. Reserve Hotel
e. Travel to Hawaii
f. Travel to Home
x. No label

Part B

a. Focusing on the part of the diagram that describes the reservation process, both for flights and hotels. Which of the following partial models would acceptably replace the parallel gateways and reservations tasks so that the model addresses the new situation?

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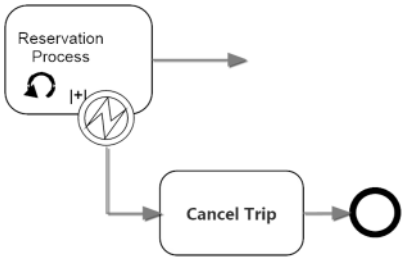
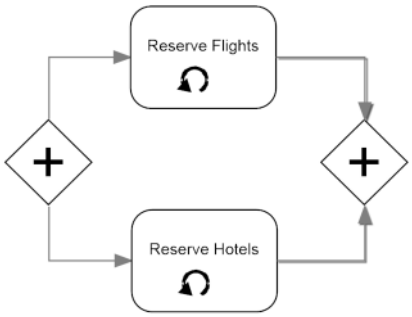
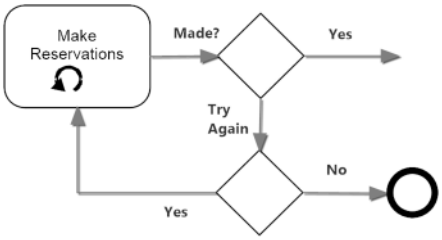
1.



2.



3.



4. None of these

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Problem 4

Part A

For each step in the diagram from the beginning, enter the appropriate symbol and label. If two events can occur at the same time, enter information for both. The 2nd, 6th, and 10th steps have been entered for examples.

Step	Symbol(s)	Label(s)
1	**k**	**x**
2	d and h	a
3	**d and h**	**b**
4	**d and h**	**c**
5	f	x
6	d and d	g and e
7	**f**	**x**
8	**d**	**d**
9	**f**	**x**
10	b and d	f and x
11	**b**	**x**

<u>Select from the following symbols</u>

a. Start Event
b. End Event
c. Intermediate Event
d. Task
e. Exclusive Gateway
f. Inclusive Gateway
g. Parallel Gateway
h. Looping Task
i. Intermediate Timer Event
j. Intermediate Error Event
k. Start Timer Event

<u>Select from the following labels</u>

a. Assemble W-2 and 1099 Forms
b. Download IRS forms and instructions
c. Fill out forms
d. Mail Tax Filing
e. Print Forms
f. Receive and Deposit Refund
g. Write check
x. No label

Part B

For each step in the diagram from the beginning, enter the appropriate symbol and label. If two events can occur at the same time, enter information for both. The 5th and 8th steps have been entered.

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Step	Symbol(s)	Label(s)
1	**k**	**x**
2	**d and h**	**a**
3	**d**	**h**
4	**f**	**x**
5	d and d	d and e
6	**f**	**x**
7	**f**	**x**
8	b and d	f and x
9	**b**	**x**

<u>Select from the following symbols</u>

a. Start Event
b. End Event
c. Intermediate Event
d. Task
e. Exclusive Gateway
f. Inclusive Gateway
g. Parallel Gateway
h. Looping Task
i. Intermediate Timer Event
j. Intermediate Error Event
k. Start Timer Event

<u>Select from the following labels</u>

a. Assemble W-2 and 1099 Forms
b. Download IRS forms and instructions
c. Fill out forms
d. Submit tax return
e. Send check
f. Receive and Deposit Refund
g. Write check
x. No label
h. Use cloud software

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Problem 5

Part A

For each step in the diagram from the beginning, enter the appropriate symbol and label. If two events can occur at the same time, enter information for both. For example, the 2nd and 6th steps are entered.

Step	Symbol(s)	Label(s)
1	**a**	**x**
2	d	a
3	**d**	**b**
4	**d**	**c**
5	**g**	**x**
6	d and d	e and f
7	**b**	**x**

Select from the following symbols

a. Start Event
b. End Event
c. Intermediate Event
d. Task
e. Exclusive Gateway
f. Inclusive Gateway
g. Parallel Gateway
h. Looping Task
i. Intermediate Timer Event
j. Intermediate Error Event
k. Start Timer Event

Select from the following labels

a. Complete smog check
b. Submit registration renewal
c. Receive new registration
d. Obtain repairs
e. Place registration in glove box
f. Place tags on license
x. No label

Part B

For each step in the diagram from the beginning, enter the appropriate symbol and label. If two events can occur at the same time, enter information for both. For example, the 2nd and 7th steps are entered.

Step	Symbol(s)	Label(s)
1	**l**	**x**
2	d and j	a and x
3	**d**	**d**

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4	**d**	**b**
5	**d**	**c**
6	**f**	**x**
7	d and d	e and f
8	**b**	**x**

Select from the following symbols

a. Start Event
b. End Event
c. Intermediate Event
d. Task
e. Exclusive Gateway
f. Inclusive Gateway
g. Parallel Gateway
h. Looping Task
i. Intermediate Timer Event
j. Intermediate Error Event
k. Start Timer Event
l. Start Message Event

Select from the following labels

a. Complete smog check
b. Submit registration renewal
c. Receive new registration
d. Obtain repairs
e. Place registration in glove box
f. Place tags on license
x. No label

Part C

For each step in the diagram from the beginning, list the data object used or created during that step. Steps 1 and 2 are filled in for example.

Step	Symbol(s)	Label(s)	Data Object Used	Data Object Created
1	Start Message Event	None	None	None
2	Task	Complete Smog Check	**a**	**b**
3	Task	Submit Renewal	**a and b**	**None**
4	Task	Receive New Documents	None	c
5	Inclusive Gateway	None	**None**	**None**
6	Task, task	Place registration in glove box, Put tags	**a and b**	**None**

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		on license		
7	End Event	None	**None**	**None**

Select from the following data objects

a. Renewal forms
b. Smog certificate
c. New registration and tags

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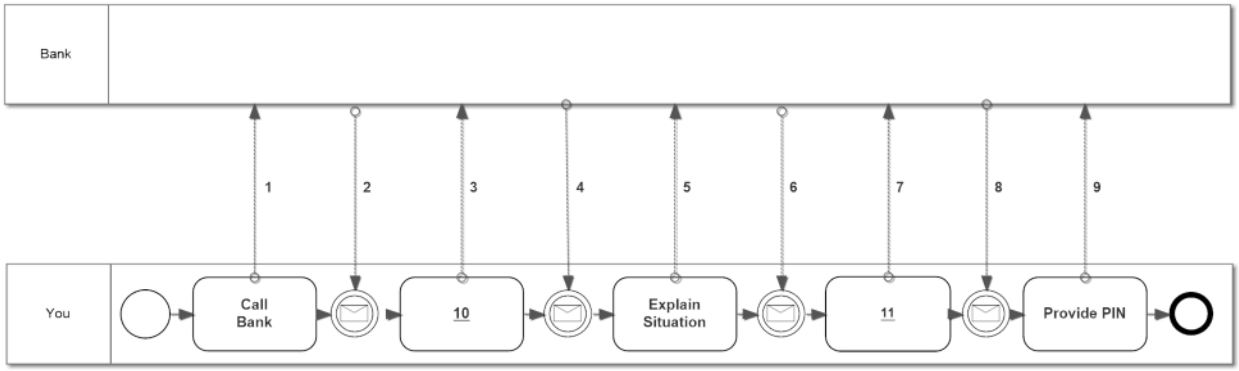
Problem 6 (Available in Connect Only)

Consider the following description and then select the appropriate names for the numbered message flows and activities in the diagram below.

You lost your wallet and your credit card. You recognize that you need to call your bank to cancel the credit card and get a new one. This process starts when you call the bank's central number. The bank's automated system provides you several options. You select the option that allows you to speak to a customer service representative. After a short wait, the representative answers your call and asks how they can help. You explain the situation. The representative cancels the credit card. Then, you ask if the bank could expedite delivery of a new card, since you are leaving on vacation in a few days. The representative makes the arrangements and then asks you to set a new PIN for your card. You select your new PIN. The representative then summarizes the transactions and asks if there is anything else. You say no and the call ends.



Select your answers from the following options:

A. Request expedited delivery
B. How can I help?
C. Call to bank
D. PIN selection
E. Confirm delivery and request PIN
F. Select call system option
G. Selected option
H. Lost card information
I. Card cancelled and new card issued information
J. Bank system options
K. Request for expedited delivery
L. Write down new card number

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Solution:

1. C
2. J
3. F
4. B
5. H
6. I
7. K
8. E
9. D
10. F
11. A

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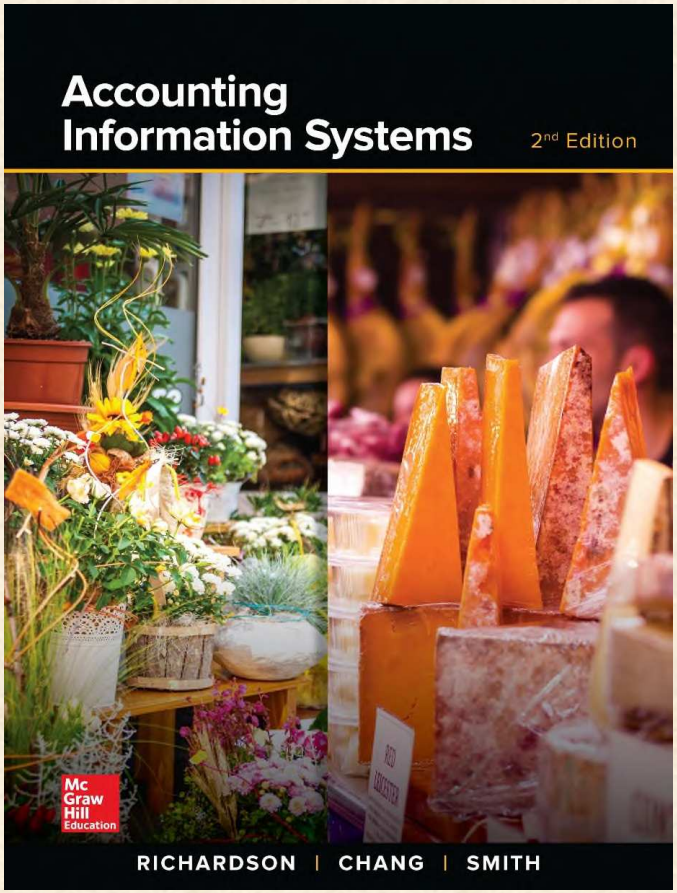

Chapter 2

Accountants as Business Analysts

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Learning Objectives

1. Describe the roles of the accounting/finance function in business and why those roles require knowledge of technology and business processes
2. Understand the importance of business process documentation
3. Recognize the value of business models
4. Articulate the characteristics of activity models
5. Understand and apply the building blocks for BPMN (activity) diagrams
6. Use pools and lanes to identify process participants
7. Apply message flows to show interactions between pools
8. Understand and apply flow object types
9. Recognize and model repeating activities
10. Understand and apply data objects and stores to model data created, updated, transferred and deleted in a process

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LO# 1

Changing Roles of Accountants in Business

- In the past accountants focused on
  - Stewardship and reporting functions
  - Preparing financial reports
  - Auditing
- Now accountants also take active role in
  - Helping enterprises optimize processes
  - Achieving competitive advantage
  - Maximizing shareholder value

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LO# 1

Changing Roles of Accountants in Business

- Rapid changes in technology increase availability of data
  - Business intelligence systems
  - ERP systems
- Information produced by systems must support the information requirements of the enterprise's decision makers
- Accountants involved in supporting evidence-based decision making
  - Strategic planning
  - Process improvement
  - Compliance management

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LO# 1

Roles of Accountants in Business

Stewardship and Reporting	Accounting/Finance Operations	Business Management Support
Regulatory compliance	Finance and accounting processes	Management information
Tax returns	Financial close	Planning budgeting and forecasting
Stakeholder assurance	Financial reporting and analysis	Performance measurement
Investor relations	Providing management information	Performance management
Raising capital and loans	People management	Risk management – from strategic to operational including fraud risk
Board reports	Using IT to make finance and accounting processes more efficient and effective	Investment appraisal
Statutory reporting		Cost management
		Supply chain management

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LO# 1

Changing Roles of Accountants in Business

- To prepare for their changing roles accountants must:
  - Understand the business and how it collects summarizes and communicates business information
  - Understand how the business delivers value to its customers
  - Understand the risks that the business faces and the internal controls in place to mitigate those risks
  - Understand how accounting information systems collect summarize and report business process information

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LO# 2

Definitions

- **Business Process**: a defined sequence of business activities that use resources to transform specific inputs into specific outputs to achieve a business goal.
- **Business Analysis**: the process of defining business process requirements and evaluating potential improvements.
- **Business Model**: a simple abstract representation of one or more business processes.
- **Documentation**: explains how business processes and business systems work; a tool for information transmission and communication

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LO# 2

Importance of Business Process Documentation

- Documentation includes:
  - Business process models
  - Business rules
  - User manuals training manuals
  - Product specifications
  - Software manuals
  - Schedules
  - Organization charts
  - Strategic plans

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LO# 2

Importance of Business Process Documentation

- Sarbanes-Oxley Act of 2002
  - Made documentation essential for businesses
  - Requires managers to assess and attest to the business's internal control structure and procedures
  - Requires external auditors to audit management's assessment of the effectiveness of internal controls and express an opinion on the company's internal control over financial reporting

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LO# 2

Importance of Business Process Documentation

- Documentation supports the following:
  - Employee training
  - Internal and external audit requirements
  - Accountability
  - Standardized communication within the enterprise
  - Standardized communication between the enterprise and its customers, suppliers, and other stakeholders

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LO# 2

Importance of Business Process Documentation

- Facilitates process improvement
  - Effectiveness – are the outputs obtained as expected?
  - Efficiency – can outputs be produced with fewer inputs?
  - Internal control – are controls working?
  - Compliance – does the process comply with constantly changing local, state, federal, and international laws and regulations

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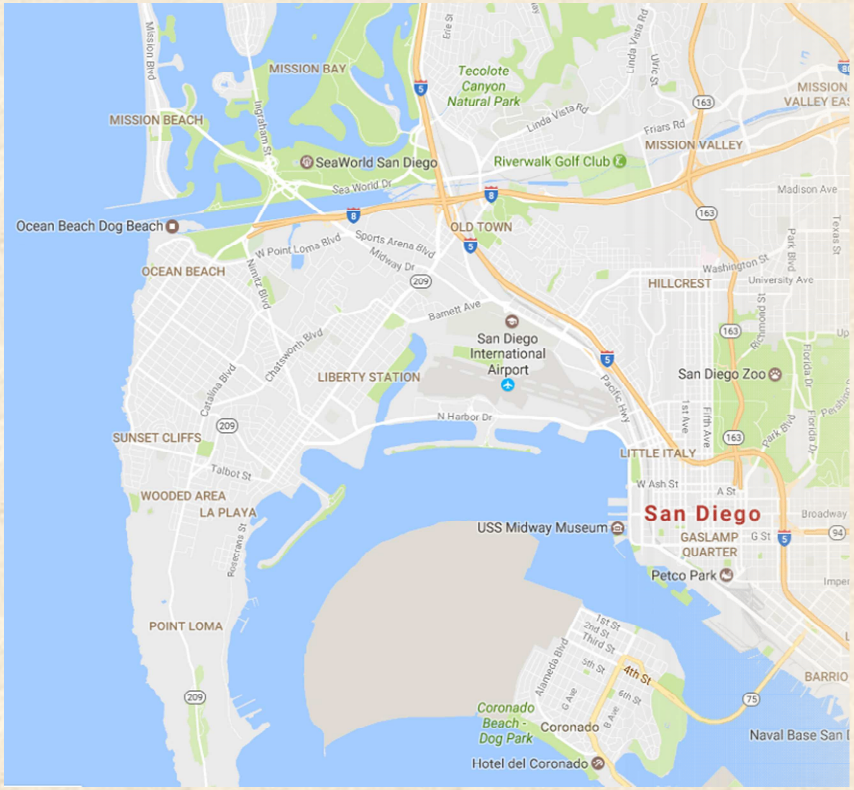
LO# 3

Value of Business Models

- How many words would it take to provide the same information as this map of San Diego?
- Similarly, business processes and systems can also be difficult to describe concisely using words alone.
- Business models – like this map - allow us to depict the important features of business processes and systems clearly and concisely.



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LO# 3

Value of Business Models

- Organizational changes, including mergers, acquisitions, outsourcing, offshoring, product innovation, and continuous process improvement, and other business transformations are common.
- Change, however, can be expensive and risky. Careful planning is necessary to implement change in a way that minimizes those costs and risks.
- Business models create value by providing communication, training, analysis and persuasion tools.
  - Presenting information more concisely and clearly than a written description
  - Managing complexity by incorporating only the essential elements
  - Eliciting requirements when used to interview involved parties
  - Reconciling viewpoints by providing an integrated view
  - Simulating potential changes
  - Specifying requirements for the actual business process

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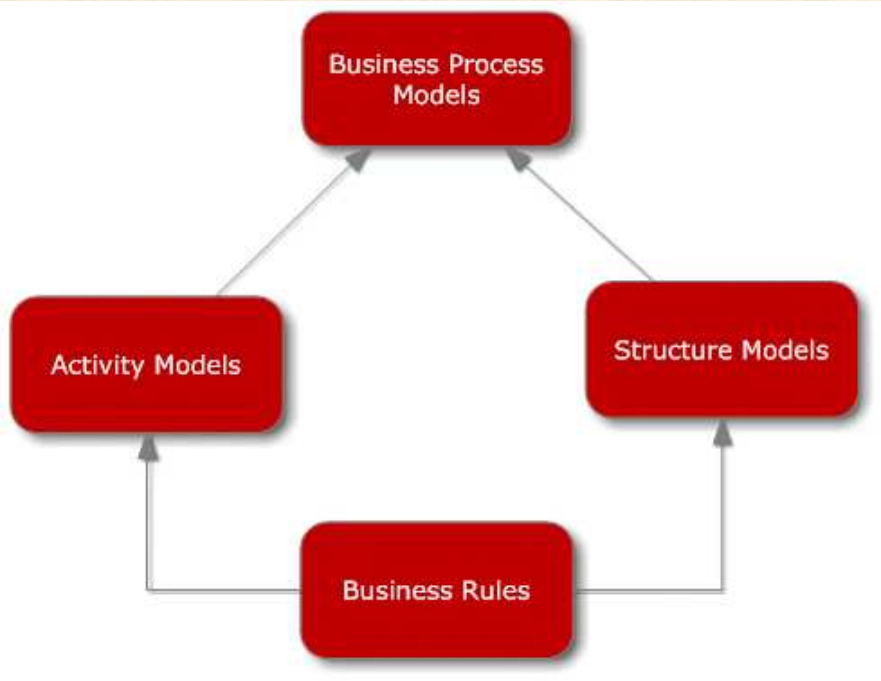
LO# 3

Types of Business Models



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LO# 4

Activity Models

- Used to analyze business processes and design changes since well before 1920
- Describe the sequence of workflow in a business process
- Represent the sequential flow and control logic of a set of related activities
- Tools for planning, documenting, discussing, and implementing systems

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LO# 4

Activity Models

- Variety of activity models – changing as technology changes
  - Flowcharts
  - Data flow diagrams
  - Business process maps
  - IDEF0 functional models

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LO# 4

Activity Models - Must be Able to Describe

1. Events that start, change, or stop flow in the process
2. Activities and tasks within the process
3. The sequence of flow between tasks
4. Decision points that affect the flow
5. Division of activity depending on organizational roles

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LO# 5

BPMN for Activity Diagrams

- BPMN stands for business process modeling notation
- The Object Management Group maintains the BPMN specification
- First specification issued in 2004 widely adopted
- Specifically designed for process modeling
- Designed to be understood by business people
- Software available to support modeling and subsequent process simulation

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LO# 5

"Good" BPMN Models

- They are correct; they do not violate BPMN standards.
- They are clear; they describe the logic of the business process.
- They are complete; they show all the important elements of the process.
- They are consistent; the process logic should always result in a similar model.

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LO# 5

BPMN Basic Building Blocks - Events

- Events include start, intermediate, and end events. Intermediate events affect the flow of a process, but do not start or end the process.

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LO# 5

BPMN Building Blocks - Activities

- Activities represent specific steps in the business process. Basic activities are modeled as rounded rectangles
- Each activity is described with a short verb phrase

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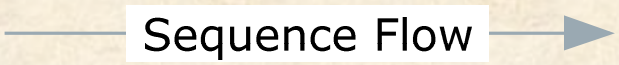
LO# 5

BPMN Building Blocks – Sequence Flows

- Represented by arrows to indicate the progression of activity within the process



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LO# 5

BPMN Building Blocks – Gateways

- Show process branching and merging as the result of decisions
- Usually gateways appear as pairs on the diagram. The first gateway shows the branching and the second gateway shows merging of the process branches.

Gateway

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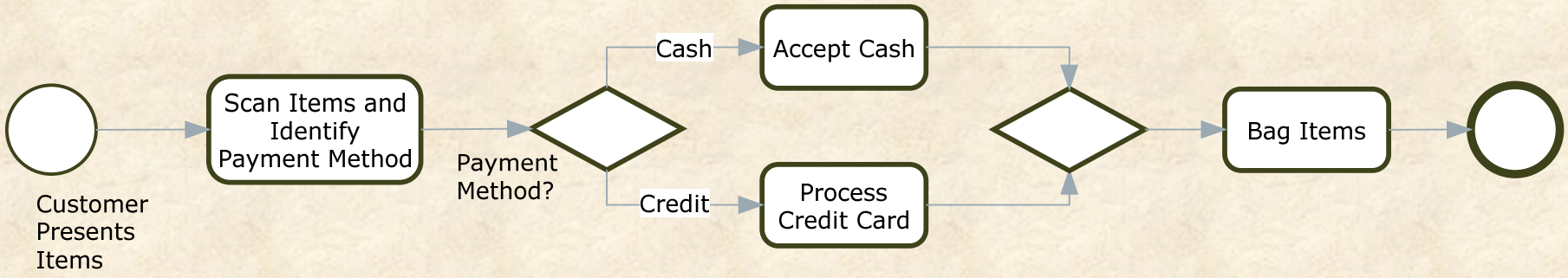
LO# 5

BPMN Example



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LO# 5

BPMN Pools and Swimlanes

- Identify participants in a business process
- Pools identify organizations
- Lanes identify departments or individuals within the organizations
- Tasks/activities are assigned to one participant to show responsibility
- Each pool must include one start and at least one end
- The sequence flow must not break between the start and end

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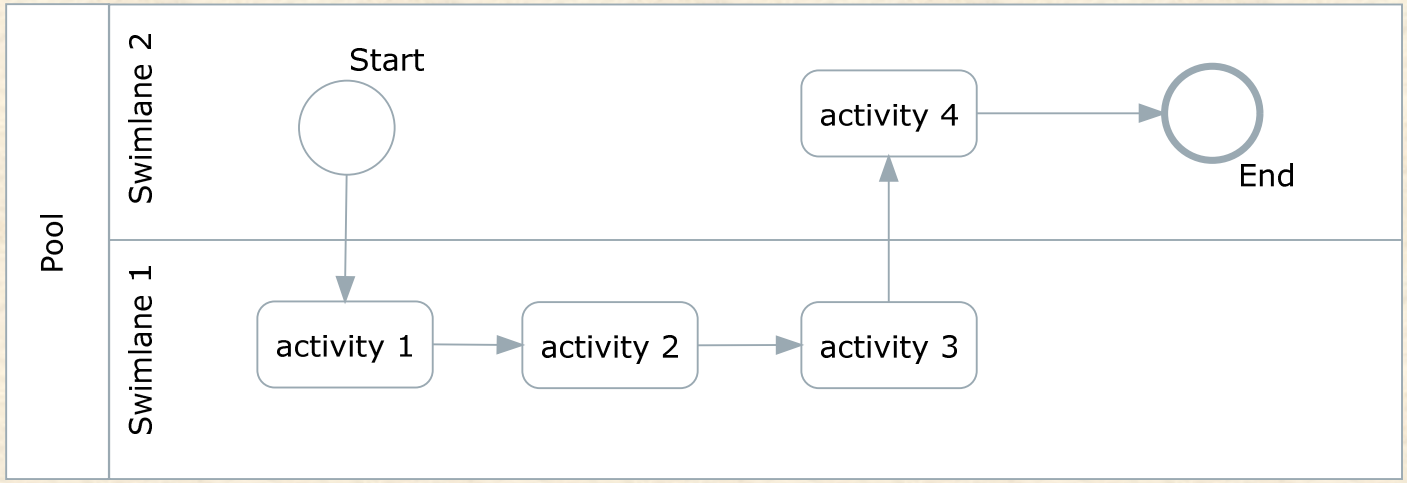
LO# 5

BPMN Pools and Swimlanes - Example



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LO# 5

BPMN Pools and Message Flows

- Exchanges between two participants (pools) in the same process are represented as message flows
- Message flows are shown as dashed lines with an arrow on the destination end and a small circle on the source end
- Message flow content should be described with text

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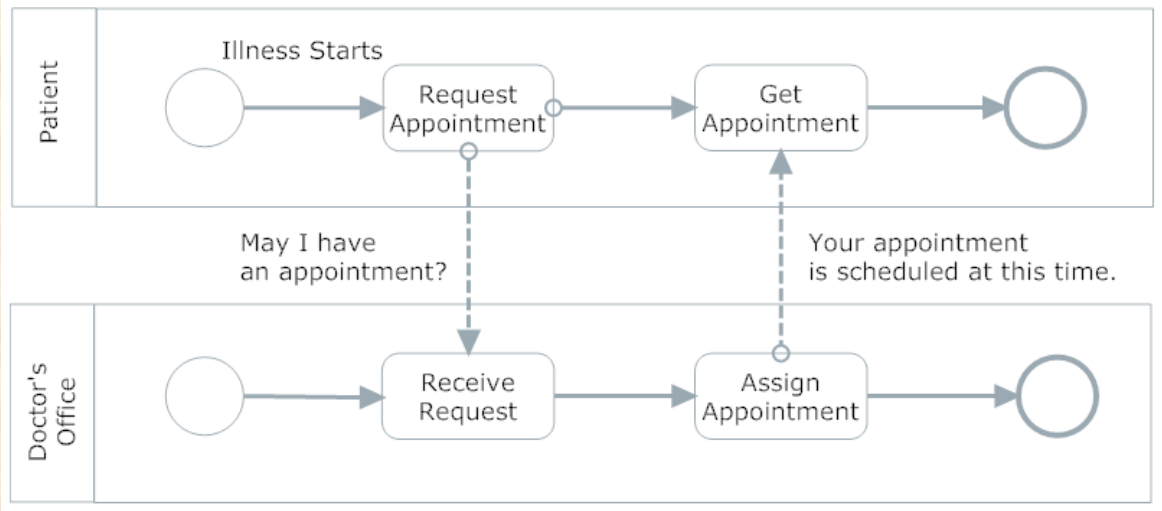
LO# 5

BPMN Pools and Message Flows - Example



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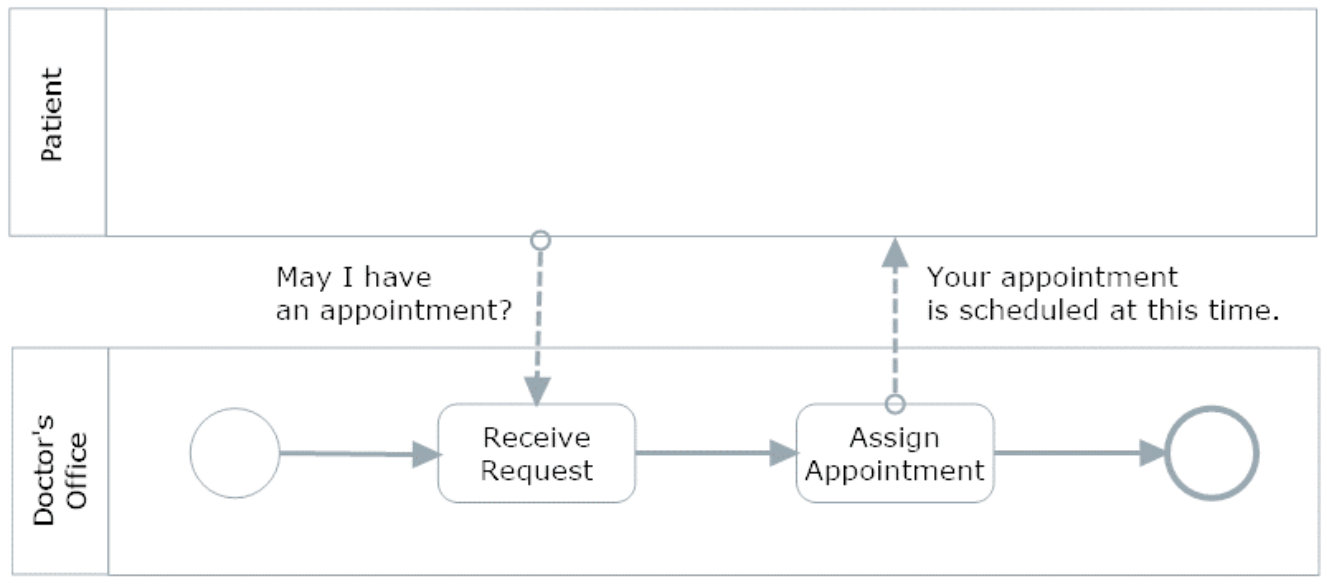
LO# 6, 7

BPMN Pools and Message Flows - Example



Usually, modelers are not very interested in activities in the external pool. Yet, we remain concerned about the message flows between the pools. So, we can make the patient's pool opaque, hiding the activities, but still showing the message flows. Note that the message flows now attach to the edge of the patient pool.

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LO# 8

The Token Concept

- A start event generates a token.
- That theoretical token must be able to flow through the process – along every potential path - until it reaches an end event.
- Tokens only travel along sequence flows and pass through process flow objects.
- Tokens do not traverse message flows.

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LO# 8

Flow Object Types

- Flow objects include events, activities, and gateways.
- Sequence flows only connect to flow objects.
- Each flow object can be further characterized by type by adding a type icon to the specific flow object symbol.
- For example, a “timer” event would show the event with a clock face icon inside, and a “message” event would show the event with an envelope icon inside.

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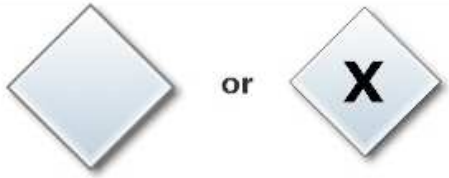
LO# 8

Gateway Types

	Exclusive Gateway. For branching exclusive gateways, only one path can be taken out of the gateway for each instance of a process depending on the branching conditions.
	Inclusive Gateway. For branching inclusive gateways, one or more paths can be taken out of the gateway for each instance of a process depending on the branching conditions. Merging inclusive gateways synchronize the flow.
	Parallel Gateway. For branching parallel gateways, all paths are taken out of the gateway. Merging parallel gateways synchronize the parallel flows.

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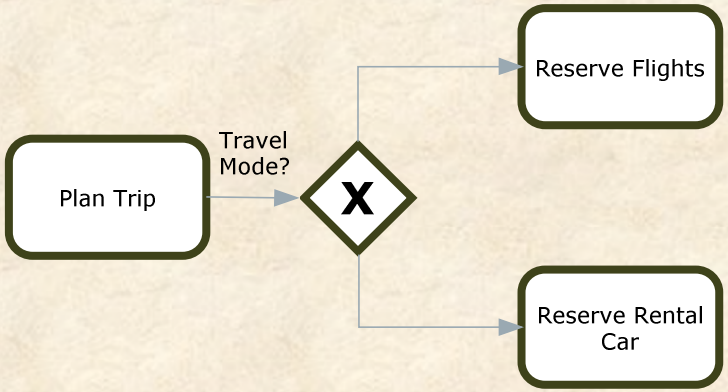
LO# 8

Exclusive Gateway



The Trip Involves Air Travel or Car Travel but not Both

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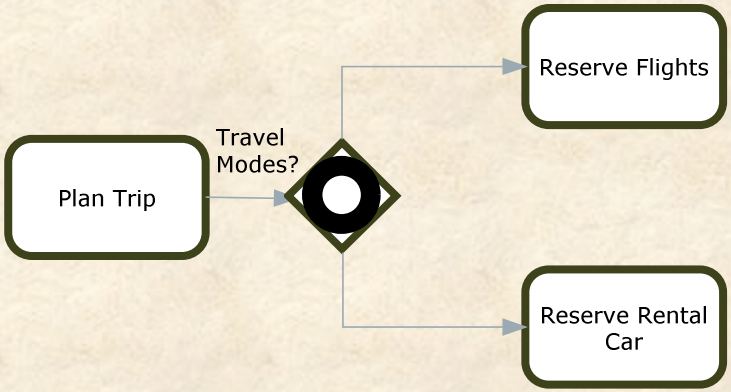
LO# 8

Inclusive Gateway



The Trip may involve either Air Travel, Car Travel, or Both

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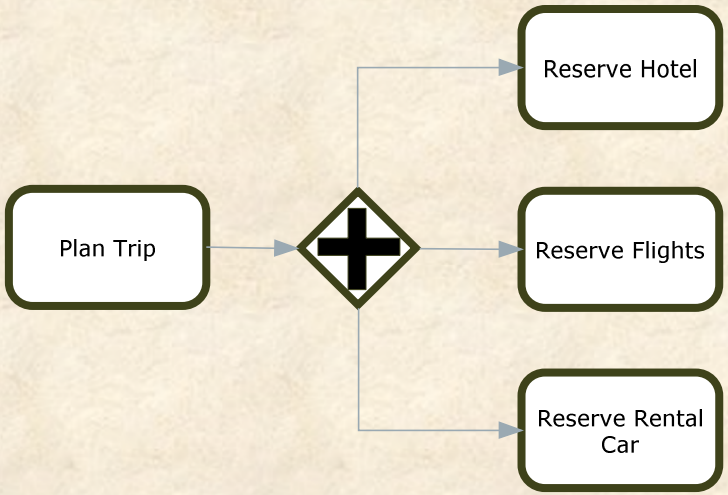
Parallel Gateway



The Trip involves Air Travel, Car Travel, and Hotel Stays

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LO# 8

Event Types

	Start message (catching) event. This is used to begin a process based on an incoming message, such as a sales order. Start events can only receive (catch) message and not send (throw) them.
	Intermediate message events. The white envelope is the catching event and the black envelope is the throwing event. These indicate that the process sends or receives a message from an external participant.
	End message (throwing) event. This indicates that the process sends a message when it ends. End events can only send messages and not receive them.
	Start timer event. This is used to indicate a process that starts at a particular time or date, such as creating monthly budgets.
	Intermediate timer event. This indicates a delay in the process flow until a specific time or date or for a specified period.
	Intermediate error event. This is a boundary event, discussed in more detail below, to indicate the alternate process flow when an error occurs in an activity.

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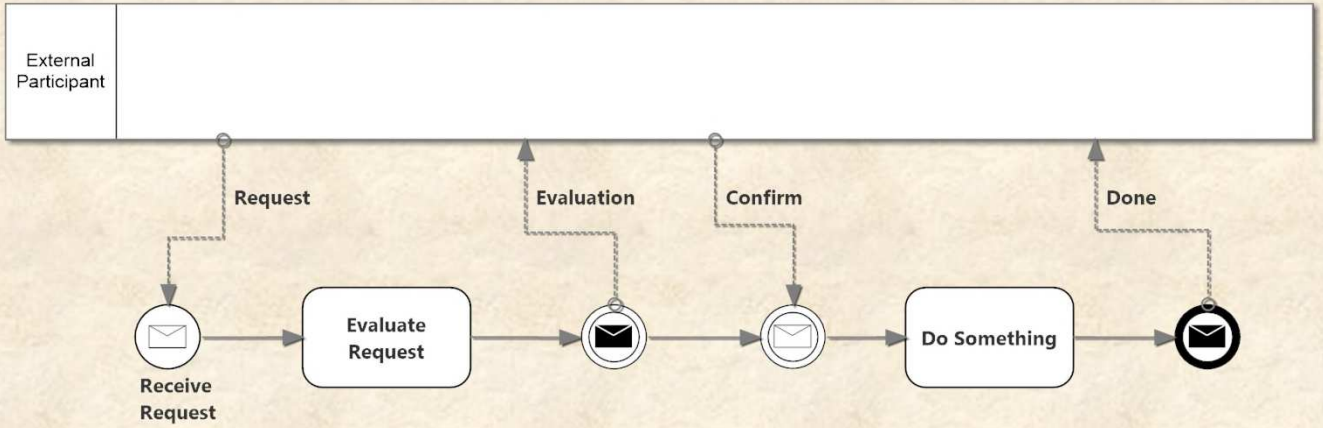
LO# 8

Message Events Example



The process starts with a start message events that receives (catches) the “Request” message from the external participant. The process proceeds to the “Evaluate Request” task, and then the intermediate message event sends (throws) the “Evaluation” message flow to the external participant. The process flow continues to the next intermediate message event where it waits (the token stops) until the external participant responds with the “Confirm” message flow. When the event catches the message, the sequence flow continues to the “Do Something” task and then the process ends. The end message event throws a message to the external participant that the process is done.

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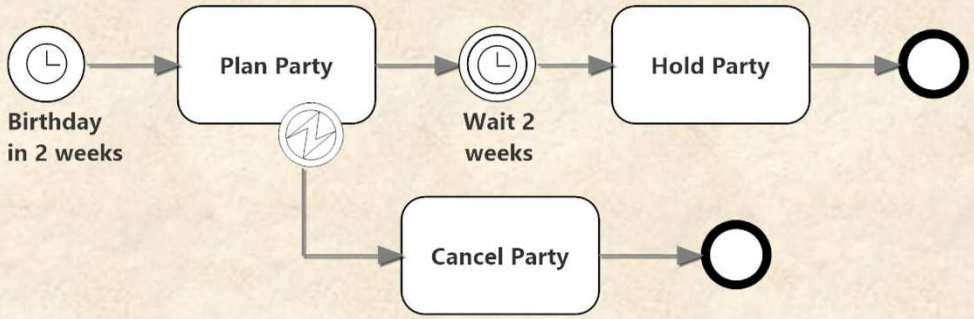
LO# 8

Timer and Boundary Events



The start timer begins the process two weeks before the birthday to be celebrated. The “Plan Party” task has an intermediate error event attached to its boundary (a boundary event). Specifically, this is an example of an interrupting boundary event that affects process flow when an error occurs in the Plan Party task. If an error occurs, then the process flows to the “Cancel Party” task and then ends. However, if the Plan Party task completes successfully, the process flows to the intermediate timer event and then waits two weeks (the token waits to proceed). After two weeks, the process continues to the “Hold Party” task and then ends.

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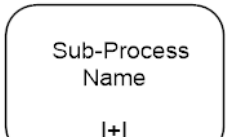
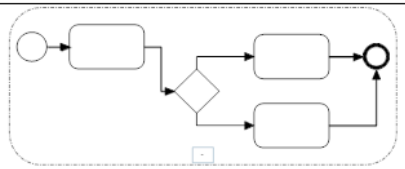
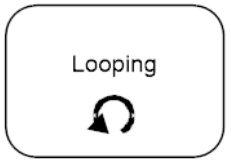
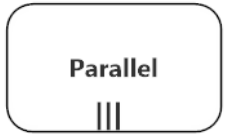
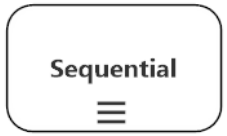
LO# 9

Subprocesses and Repeating Activities

	A collapsed subprocess contains other detailed processes that are hidden from view. It is modeled with the activity rectangle with a plus sign in a box at the bottom center. The details of the subprocess are normally shown in another diagram.
	An expanded subprocess embeds the subprocess in the current process. The subprocess is contained within the activity rectangle and includes start and end events.
	A looping task repeats until a condition is satisfied, such as until all email in the inbox is checked.
	A parallel multi-instance task is performed several times at the same time, such as when several different people perform the same task at the same time in the process.
	A sequential multi-instance task is performed several times in sequence, such as when an instructor grades tests for several students.

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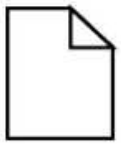
LO# 10

Data Objects, Data Stores, and Associations

	A data object. This element represents data that is only available for the duration of a process.
	A data store. This element represents data that is available across processes.
	An association connecting a data object/store to an activity. The arrowhead shows the direction of data flow when necessary.

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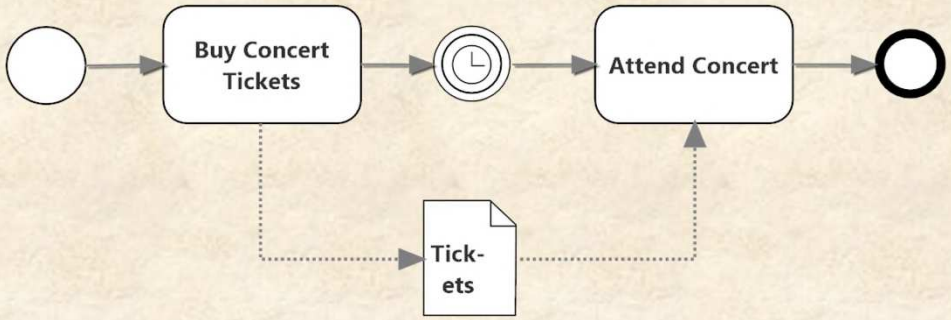
LO# 10

Data Objects Example



The process starts and the actor buys concert tickets. The tickets data object is created. Time passes until the date of the concert and then the actor attends the concert where the tickets data object is used.

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LO# 5

BPMN Modeling – Best Practices

- Focus on one business process at a time.
- Clearly identify the events that start and end the process.
- Include essential elements, but avoid distracting detail.
- Think about a token flowing from the start event through the process to the end event; the flow of the token should be clear for all paths through the process.
- Label activities clearly with a verb and an object, e.g., pay invoice.
- Model iteratively, getting feedback to improve accuracy and clarity.

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