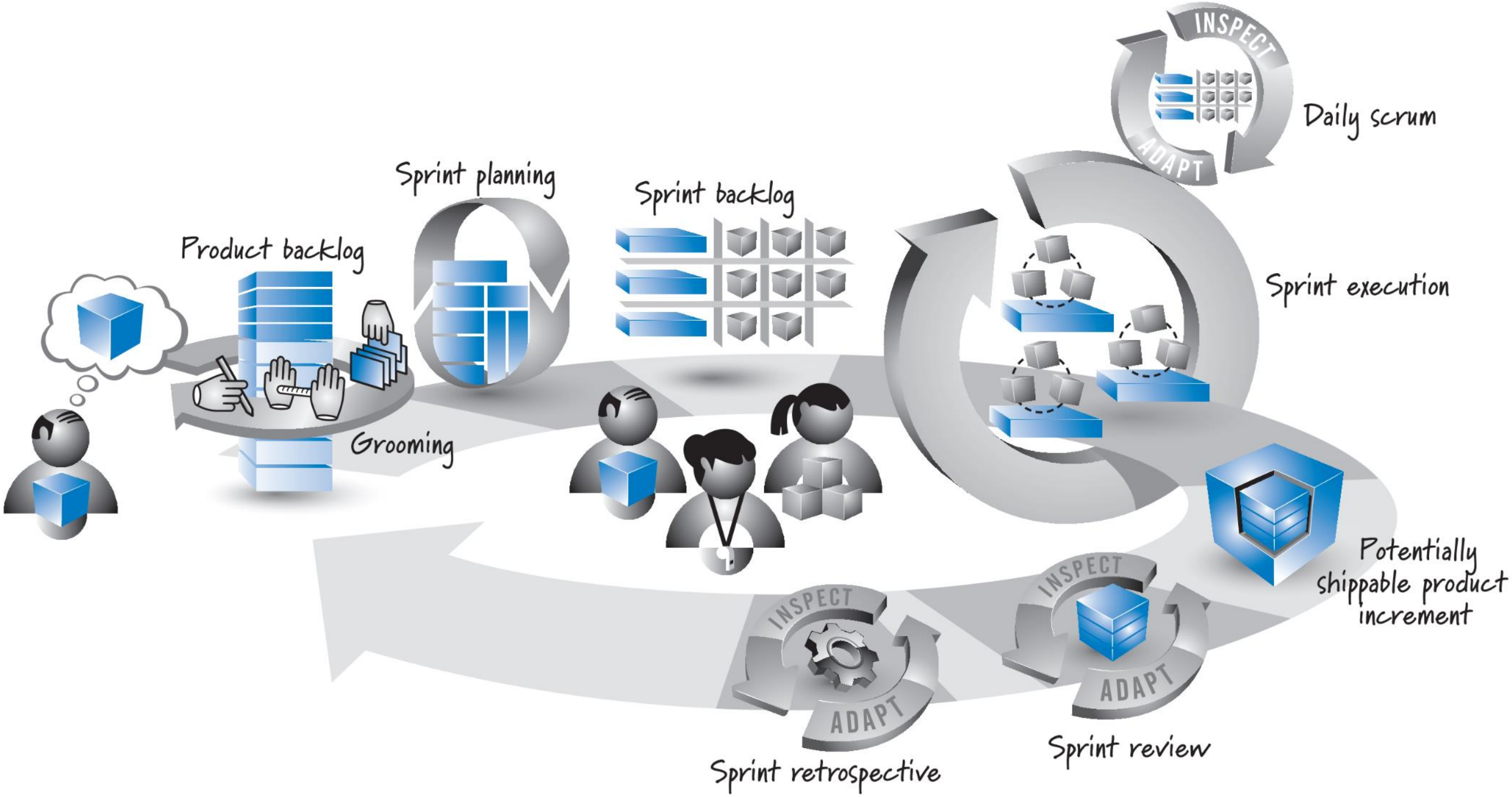
SPRINT EXECUTION

Systems Analysis and Design
Sharif University of Technology
Fall 1400-1401

Scrum Process: Activities and Artifacts

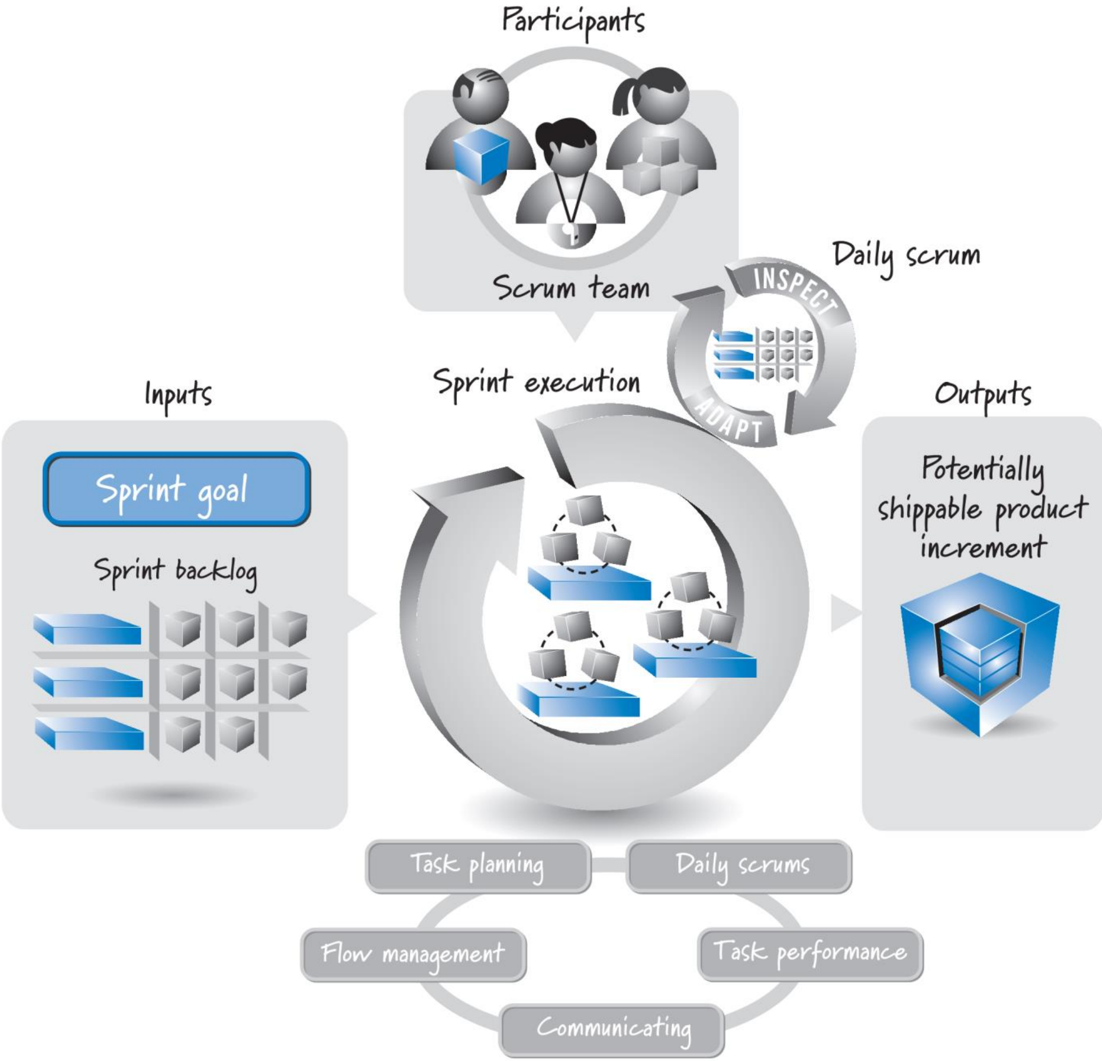


Sprint Execution

- **When?**
  - Sprint execution accounts for the majority of time during a sprint. It begins after sprint planning and ends when the sprint review starts.
    - On a two-week-long sprint, execution might account for *eight of the ten days*.

- **By whom?**
  - The full Scrum team:
    - Development team members self-organize and determine the best way to meet the goal established during sprint planning.
    - The Scrum Master acts as the coach, facilitator, and impediment remover.
    - The product owner is available during sprint execution to
      - answer clarifying questions,
      - review intermediate work and provide feedback to the team,
      - discuss adjustments to the sprint goal if conditions warrant, and
      - verify that the acceptance criteria of PBIs have been met.

Sprint Execution: Process

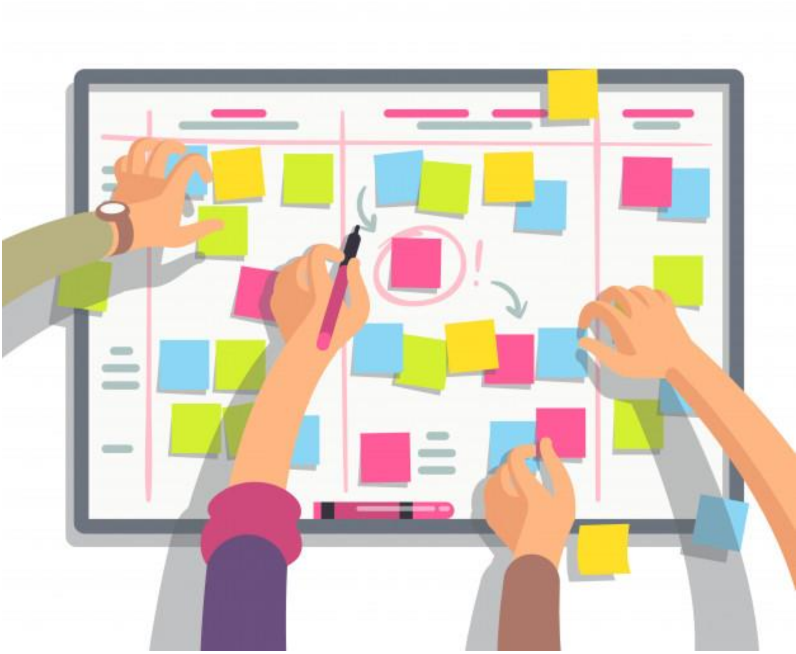


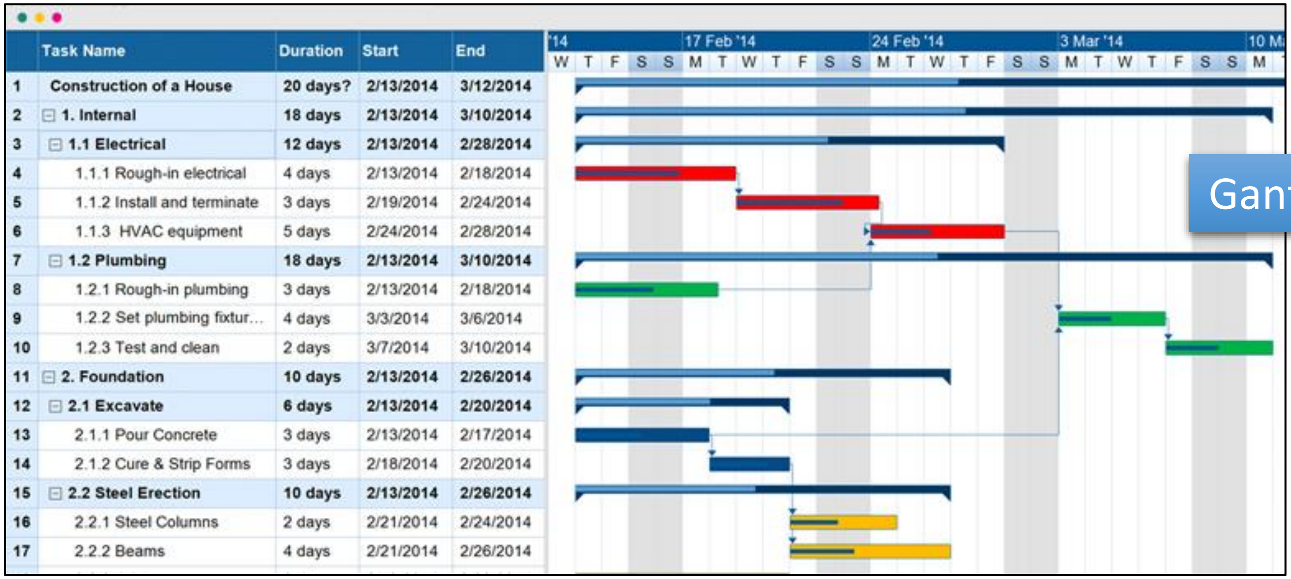
[Rubin 2012]

Activities: Task Planning

- Some up-front planning is typically done for exposing important task-level dependencies.
  - Preparing a Gantt chart, however, is typically not worth the effort.

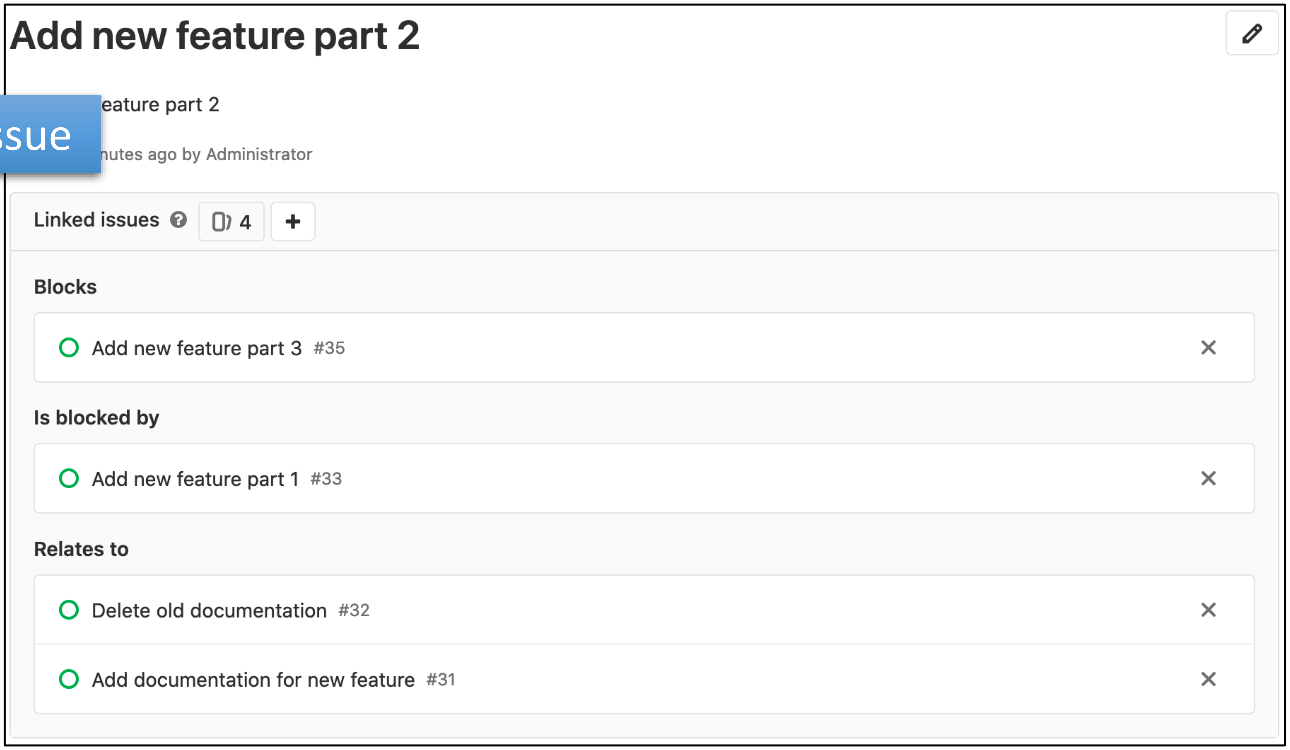
- A good principle for sprint execution is to approach task-level planning in an opportunistic, flexible and ongoing manner.
  - Allow task planning to occur continuously during sprint execution as the team adapts to the evolving circumstances of the sprint.
  - Important dependencies.





	Task Name	Duration	Start	End
1	Construction of a House	20 days?	2/13/2014	3/12/2014
2	⊟ 1. Internal	18 days	2/13/2014	3/10/2014
3	⊟ 1.1 Electrical	12 days	2/13/2014	2/28/2014
4	1.1.1 Rough-in electrical	4 days	2/13/2014	2/18/2014
5	1.1.2 Install and terminate	3 days	2/19/2014	2/24/2014
6	1.1.3 HVAC equipment	5 days	2/24/2014	2/28/2014
7	⊟ 1.2 Plumbing	18 days	2/13/2014	3/10/2014
8	1.2.1 Rough-in plumbing	3 days	2/13/2014	2/18/2014
9	1.2.2 Set plumbing fixtur…	4 days	3/3/2014	3/6/2014
10	1.2.3 Test and clean	2 days	3/7/2014	3/10/2014
11	⊟ 2. Foundation	10 days	2/13/2014	2/26/2014
12	⊟ 2.1 Excavate	6 days	2/13/2014	2/20/2014
13	2.1.1 Pour Concrete	3 days	2/13/2014	2/17/2014
14	2.1.2 Cure & Strip Forms	3 days	2/18/2014	2/20/2014
15	⊟ 2.2 Steel Erection	10 days	2/13/2014	2/26/2014
16	2.2.1 Steel Columns	2 days	2/21/2014	2/24/2014
17	2.2.2 Beams	4 days	2/21/2014	2/26/2014

Gantt Chart



Add new feature part 2

eature part 2

nutes ago by Administrator

Linked issues ❓ 4 +

Blocks

○ Add new feature part 3 #35 ✕

Is blocked by

○ Add new feature part 1 #33 ✕

Relates to

○ Delete old documentation #32 ✕

○ Add documentation for new feature #31 ✕

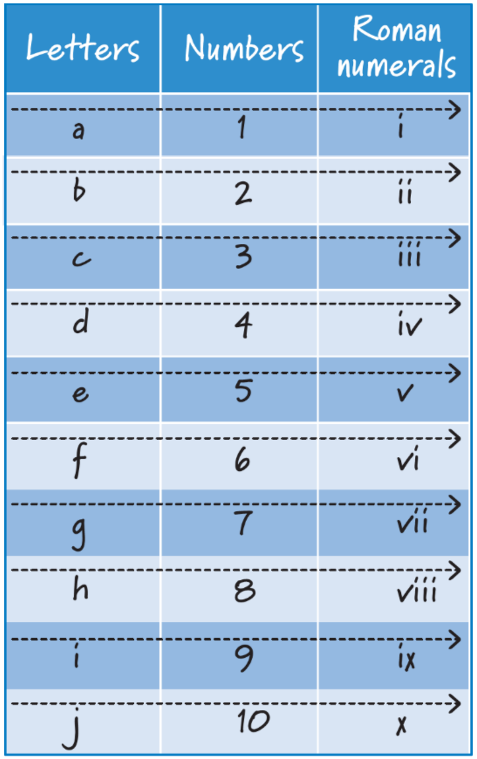
Linked issue

Activities: Flow Management

- It’s the team’s responsibility to manage the flow of work during sprint execution to meet the sprint goal.
- The team must make decisions on:
  - ✓ How much work the team should do in parallel.
  - ✓ When work should begin on a specific item.
  - ✓ How the task-level work should be organized.
  - ✓ What work needs to be done.
  - ✓ Who should do the work.
- When answering these questions, teams should *discard* old behaviors, such as
  - ✖ trying to keep everyone 100% busy,
  - ✖ believing that work must be done sequentially, and
  - ✖ having each person focus on just their part of the solution.

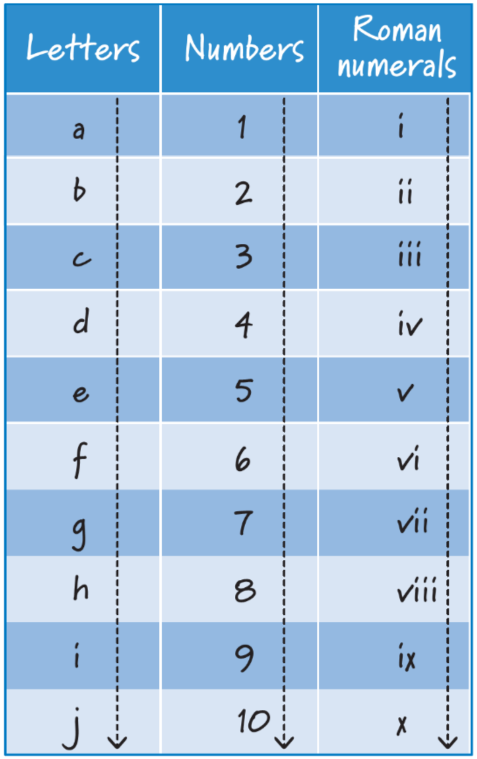
Flow Management: Parallel Work

- An important part of managing flow is determining how many PBIs the team should work on in parallel to maximize delivered value.
  - Working on too many items at once leads to multitasking, which increases the time required to complete individual items, and reduces quality.
  - Working on too few items at a time leads to underutilization of member skills and capacity, resulting in less work done and less value delivered.
  - To find the proper balance, teams work on the number of items that leverages, but does not overburden, their skills and available capacity.



Letters	Numbers	Roman numerals
a	1	i
b	2	ii
c	3	iii
d	4	iv
e	5	v
f	6	vi
g	7	vii
h	8	viii
i	9	ix
j	10	x

Row-at-a-time (multitasking)
Average time = 35 seconds



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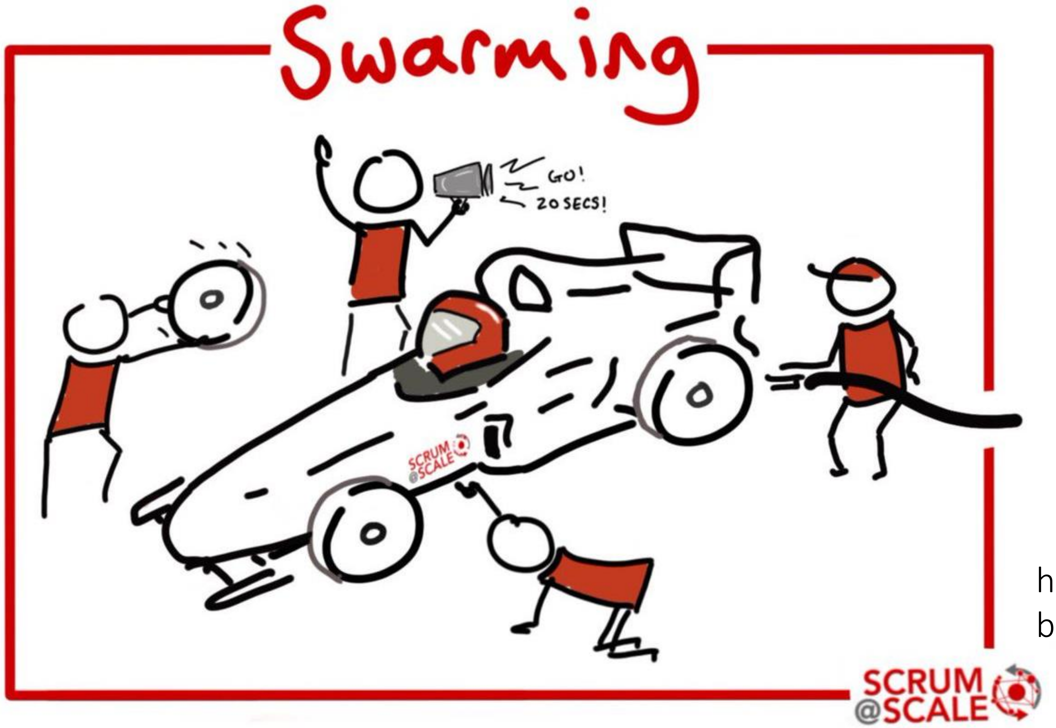
i	9	ix
j	10	x

Column-at-a-time (single tasking)
Average time = 16 seconds

[Rubin 2012]

Flow Management: Swarming

- **Swarming:** Team members with available capacity gather to work on an item to finish what has already been started before working on new items.
  - Teams with a **Musketeer attitude** and some degree of **T-shaped skills** swarm.
    - **Musketeer attitude:** “All for one and one for all.” Team members collectively own the responsibility of getting the job done.
    - **T-shaped skills:** Having deep skills in a preferred functional area, discipline, or specialty, but also able to work outside the specialty area.

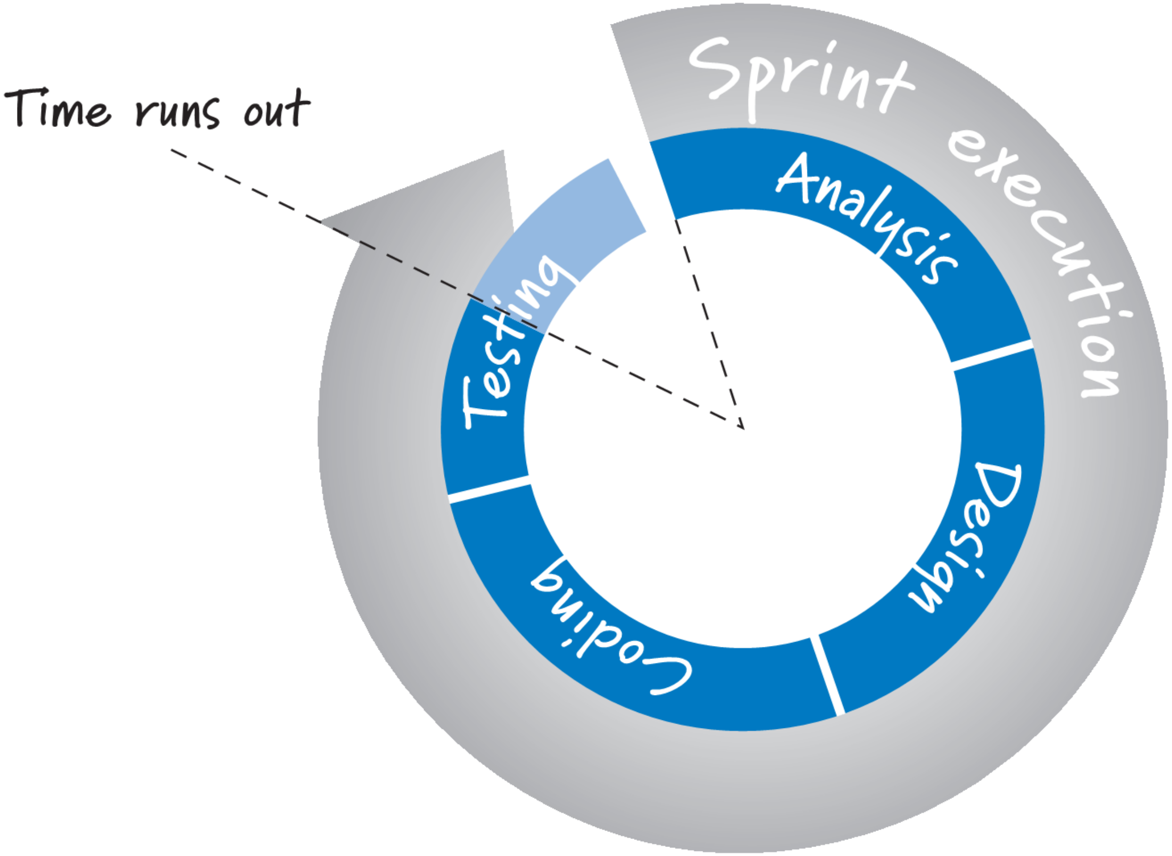


https://www.scruminc.com/swarming-instantly-boost-scrum-team-productivity/

Flow Management: Swarming

- Misconceptions:
  - Swarming is not a strategy to ensure that team members are 100% busy.
  - Swarming does not necessarily mean working on only one PBI at a time.
  - Sprint execution should not be treated like a **mini-waterfall** project.
    - In this approach, we work on all PBIs at the same time: We first analyze all the items, then design them all, then code them all, and then test them all.
    - This approach is very risky: If the team does not finish all the testing, we could end up with 90% of each feature complete, but no feature 100% done.

Risks of Mini-Waterfall Approach to Sprint Execution



[Rubin 2012]

Flow Management: Important Concerns

- **Which PBI to Start:** The simplest way is to select the next highest-priority item as specified by the product owner.
  - However, technical dependencies or skills capacity constraints might dictate that items be selected in a different order.
- **How to Organize Task Work in a PBI:** Value-delivery-focused method.
  - Team members opportunistically organize the tasks and who will work on them, and work is highly interleaved. Swarming is encouraged.
- **What Task-Level Work Should Be Done:** Ultimately, the team decides; product-owners/managers empower the team, but can affect their work by:
  - Defining the scope of a feature and its acceptance criteria.
  - Providing business-facing requirements for the definition of done.
  - Working with the team to ensure that their technical or feature-specific decisions are made in an economically sensible way.

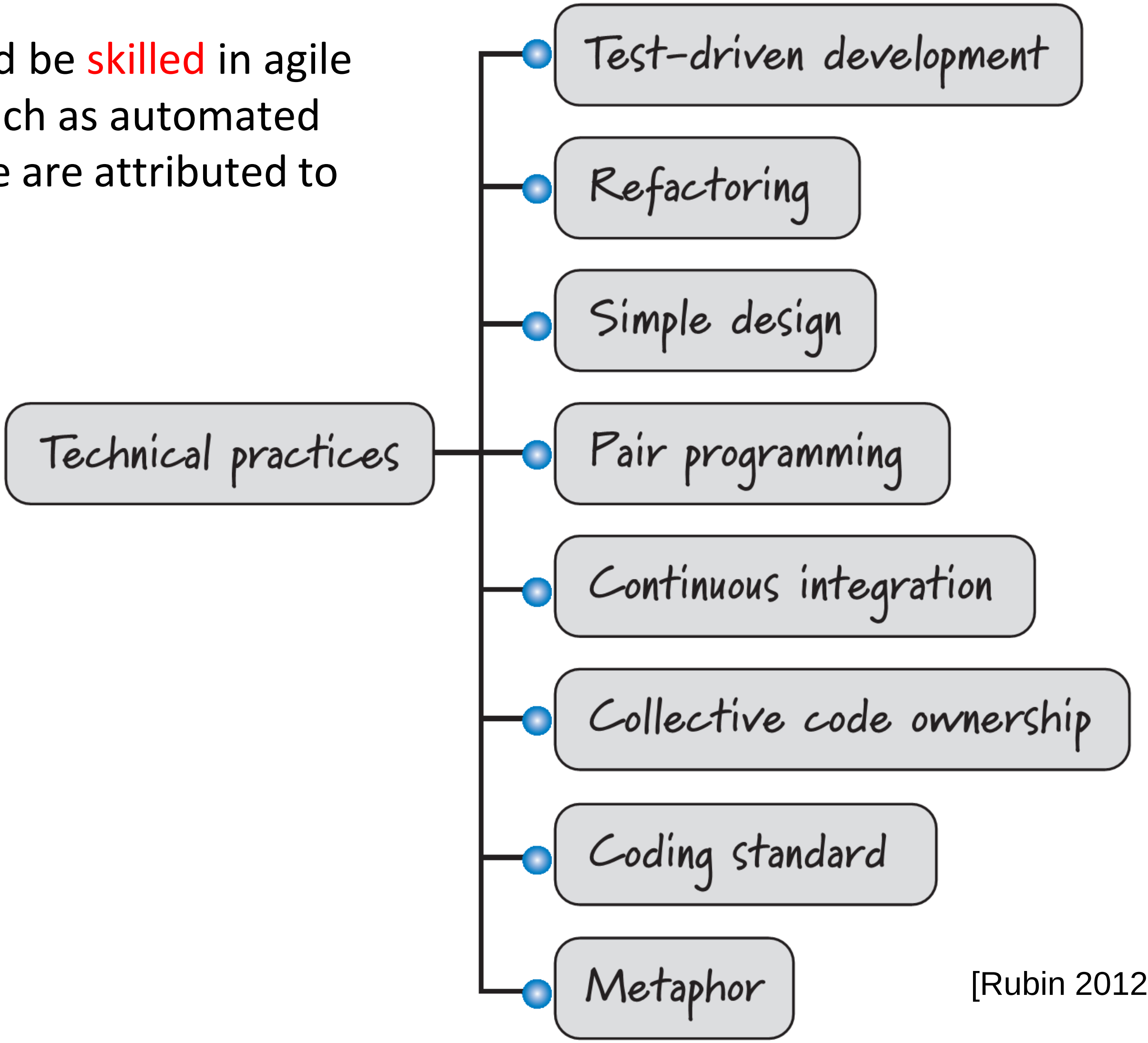
Flow Management - Activities: Daily Scrum

- The daily scrum is a critical, inspect-and-adapt activity.
  - A 15-minute, timeboxed activity that takes place once every 24 hours.
- It serves as an inspection, synchronization, and daily adaptive planning activity that helps a self-organizing team do its job better.
  - Scrum team convenes to share the big picture of what is happening so that they can collectively understand
    - how much to work on,
    - which items to start working on, and
    - how to best organize the work among the team members.
  - The daily scrum helps avoid waiting: If there is an issue that is blocking flow, the team would never have to wait more than a day to discuss it.

Activities: Performing Tasks

Technical Practices

- Team members should be skilled in agile technical practices (such as automated testing); most of these are attributed to XP.

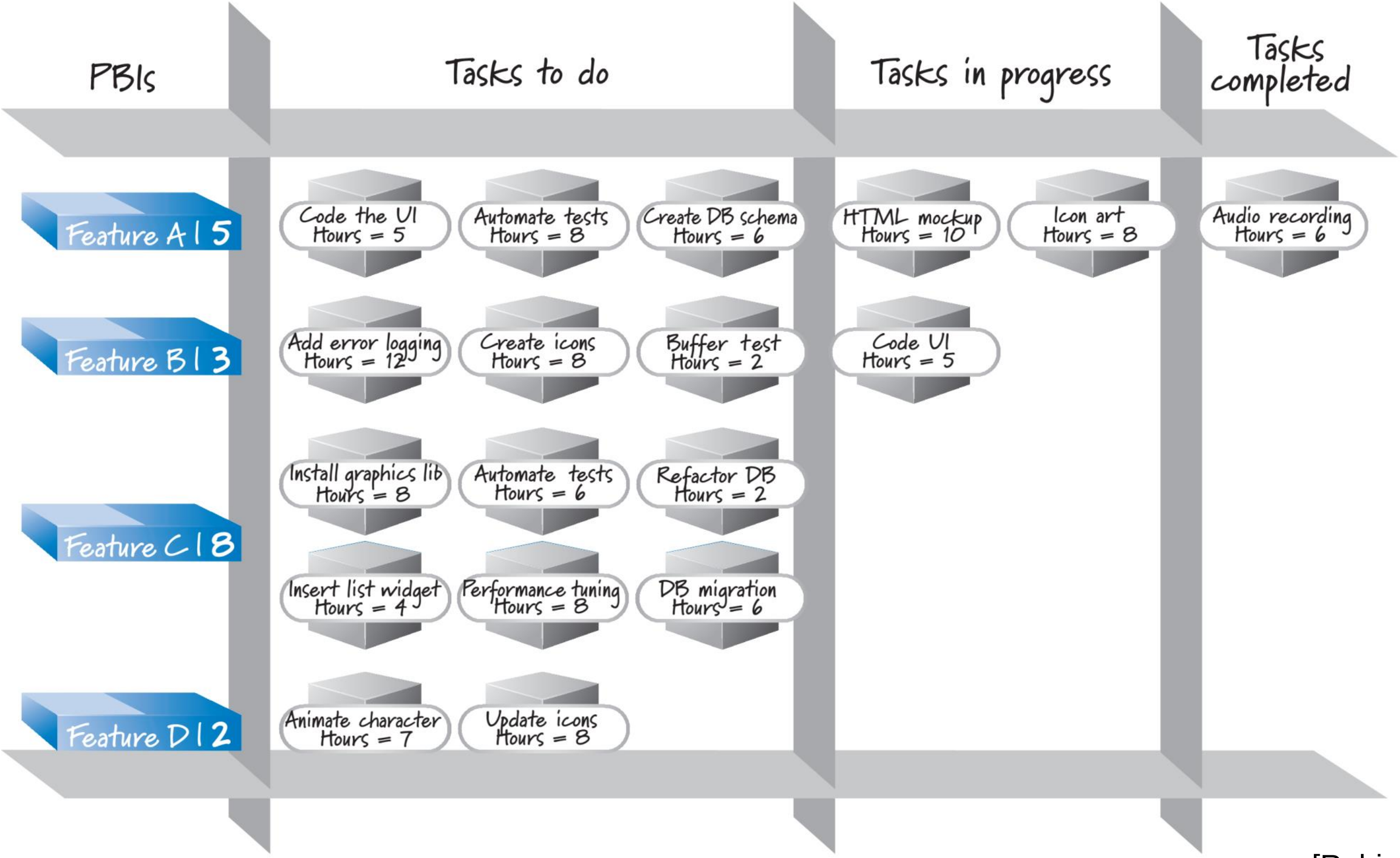


[Rubin 2012]

Activities: Communicating

- In Scrum, communicating progress is done by using simple charts as their principal Information Radiators:
  - although any highly visible way of communicating progress can be used, most teams use a task board along with a burndown chart and/or burnup chart.
- Task Board: Shows the evolving state of the sprint backlog over time.
  - Each product backlog item planned to be worked on during the sprint is shown with the set of tasks necessary to get the item done.
    - All tasks initially start off in the “to do” column.
    - As the team starts to work on the tasks of a PBI, these tasks are moved from the “to do” column to the “in progress” column.
    - When a task is completed, it is moved to the “completed” column.
  - A team may choose to put other columns on its task board if it thinks that visualizing the flow of work through other states is helpful.

Communicating: Task Board



PBIs	Tasks to do	Tasks in progress	Tasks completed

Feature A | 5	Code the UI
	Hours = 5
	Automate tests
	Hours = 8
	Create DB schema
	Hours = 6
		HTML mockup
		Hours = 10
		Icon art
		Hours = 8
			Audio recording
			Hours = 6

Feature B | 3	Add error logging
	Hours = 12
	Create icons
	Hours = 8
	Buffer test
	Hours = 2
		Code UI
		Hours = 5	

Feature C | 8	Install graphics lib
	Hours = 8
	Automate tests
	Hours = 6
	Refactor DB
	Hours = 2
	Insert list widget
	Hours = 4
	Performance tuning
	Hours = 8
	DB migration
	Hours = 6		

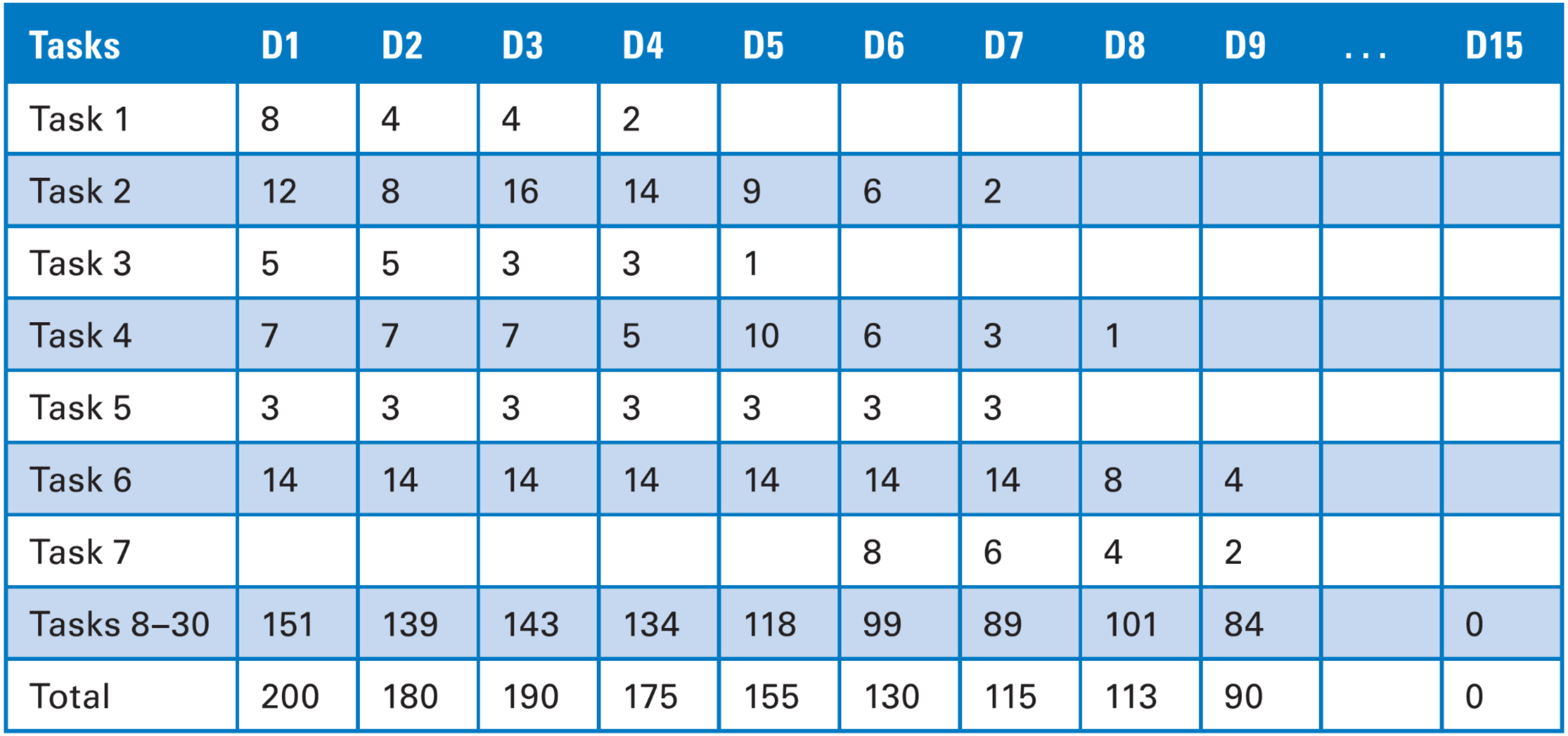
Feature D | 2	Animate character
	Hours = 7
	Update icons
	Hours = 8		

[Rubin 2012]

Communicating: Progress Charts

- Each day during sprint execution, team members update the estimate of how much effort remains (in hours) for each task.
  - A table can be used to visualize this data.
  - The number of hours remaining for each task follows the general trend of being smaller each day during the sprint.
  - If a task has not yet been started yet, the size of the task might appear the same from day to day until the task is started.
    - If a task turns out to be larger than expected, its size may increase day over day, or remain the same even after the team has started working on it.
  - New tasks related to the committed PBIs can also be added to the sprint backlog at any time, and will be reflected in the corresponding table.

Communicating: Task Progress Table

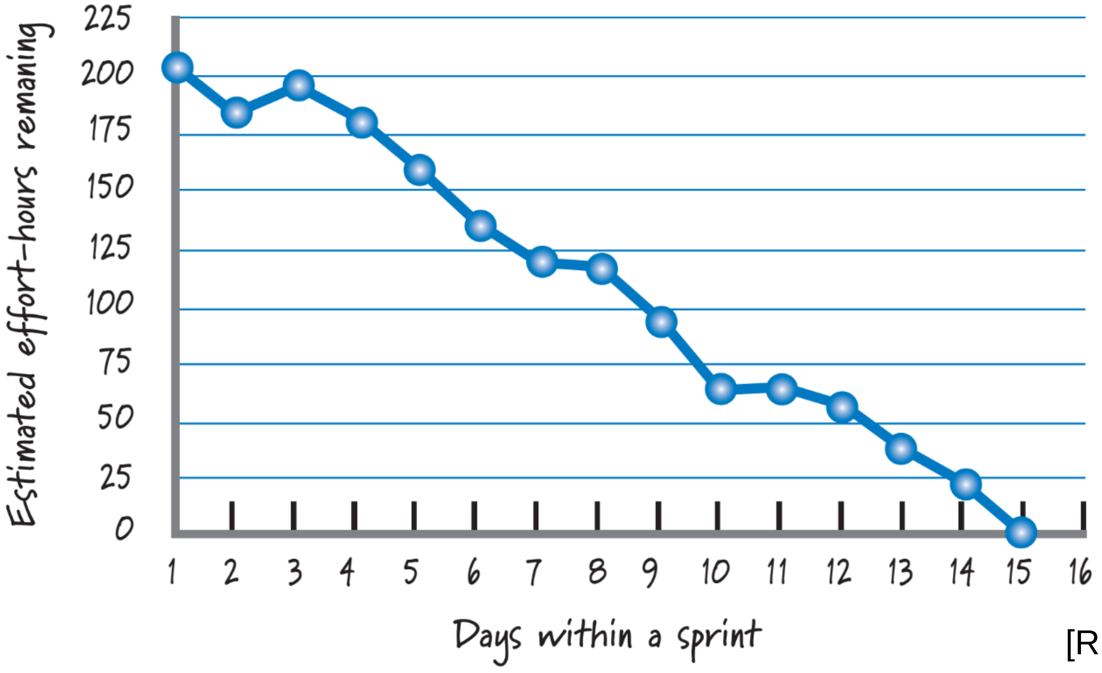


Tasks	D1	D2	D3	D4	D5	D6	D7	D8	D9	. . .	D15
Task 1	8	4	4	2							
Task 2	12	8	16	14	9	6	2				
Task 3	5	5	3	3	1						
Task 4	7	7	7	5	10	6	3	1			
Task 5	3	3	3	3	3	3	3				
Task 6	14	14	14	14	14	14	14	8	4		
Task 7						8	6	4	2		
Tasks 8–30	151	139	143	134	118	99	89	101	84		0
Total	200	180	190	175	155	130	115	113	90		0

[Rubin 2012]

Communicating: Sprint Burndown Chart

- **Sprint Burndown Chart:** The result of plotting the “Total” row, which is the sum of the remaining effort-hours across all tasks on a given day, on a graph.
  - Vertical axis numbers are the estimated effort-hours remaining, and horizontal axis numbers are days within a sprint.
  - Each day we update this chart to show the total estimated effort remaining across all of the uncompleted tasks.



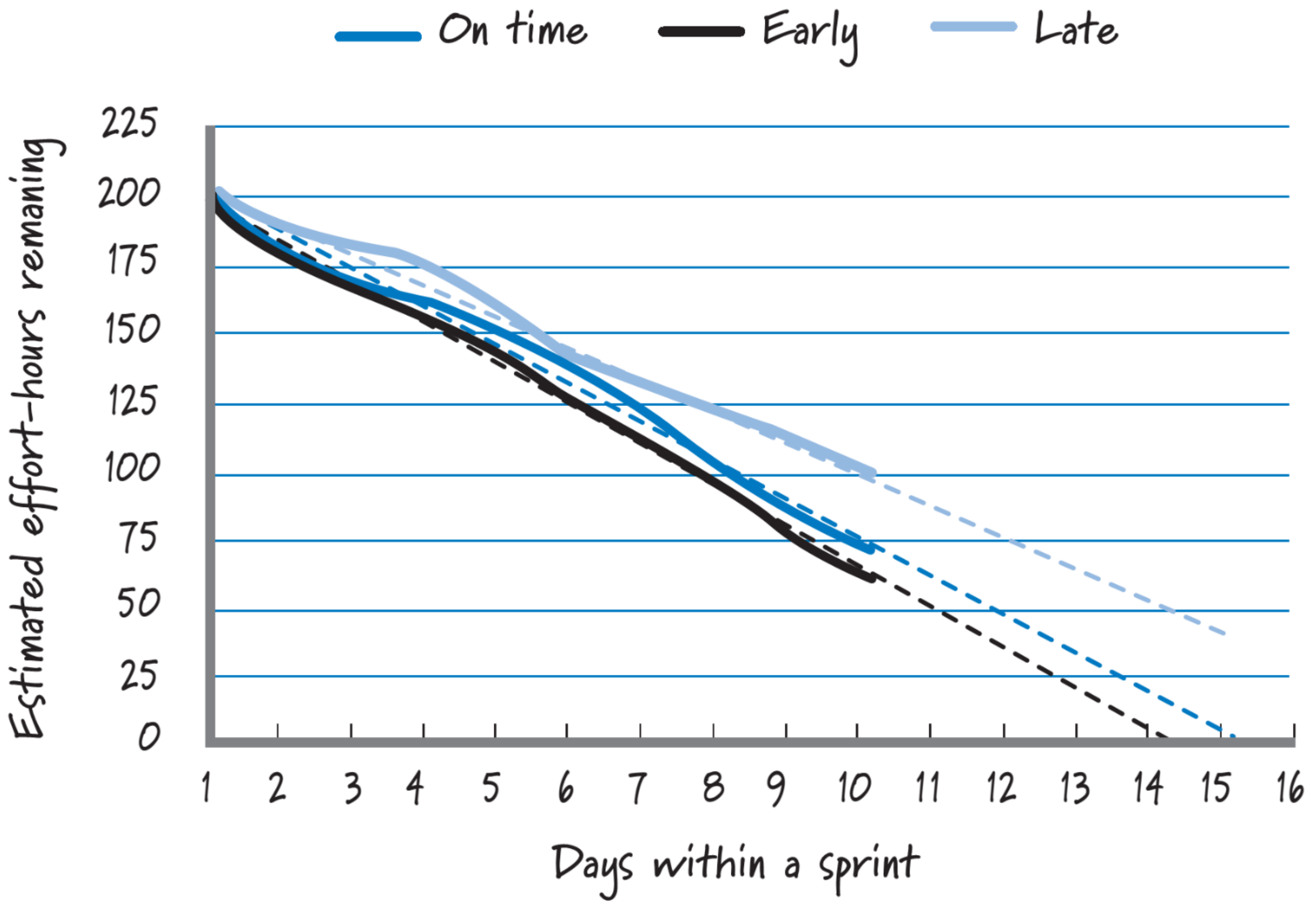
[Rubin 2012]

Communicating: Sprint Burndown Chart

- Sprint burndown charts are useful for tracking progress and can also be used as a leading indicator to predict when work will be completed.

- At any point in time, we can compute a trend line based on historical data and use it to see when we are likely to finish if the current pace and scope remain constant.
  - When the trend line intersects the horizontal axis close to the end of the sprint duration, we can infer that we're in reasonable shape ("On time").
  - When it lands significantly to the left, we should probably take a look to see if we can safely take on additional work ("Early").
  - When it lands significantly to the right ("Late"), it warns us that we're not proceeding at the expected pace or that we've taken on too much work.

Communicating: Sprint Burndown Chart (with Trend Lines)



[Rubin 2012]

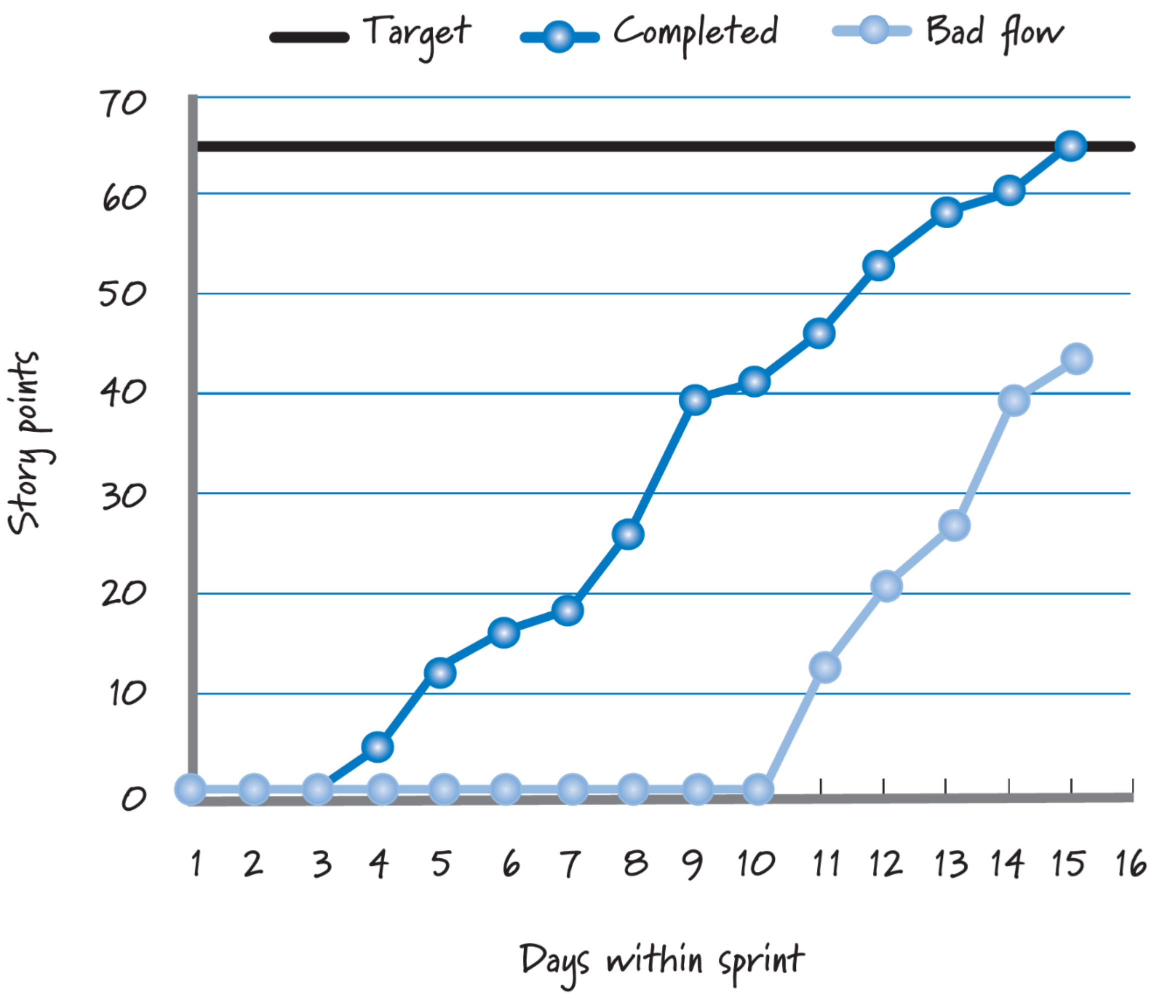
Communicating: Sprint Burnup Chart

- **Sprint Burnup Chart:** Represents the amount of work completed toward achieving the sprint goal.

- In sprint burnup charts, work can be represented in either effort-hours (as in the burndown chart) or in story points; story points are preferred because:

  1. At the end of the sprint, the only thing that really matters to the Scrum team is business-valuable work that was completed.
  2. At a glance, we can get a good feel for how the work is flowing and how the team is completing PBIs through the sprint.

Communicating: Sprint Burnup Chart



[Rubin 2012]