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This chapter presents some games we’ve played and used to introduce teams to kanban. We didn’t invent them, so we’ll try to attribute them correctly. Some of the games in the agile community are almost mythical and seem like they’ve been around forever. The true source or creator can be hidden in all the variants and changes made to the game over the years. We’ve gone through our network of colleagues to try to find the sources for the games we introduce—hopefully we’ve tracked down the correct ones. If we’ve failed to do so, we’re sorry; please help us correct this by sending us a message via the Author Online link at www.manning.com/kanbaninaction.

As you start to use kanban with your team and at your workplace, you’ll soon find others around you who are interested in what you’re doing. It might even be
the case that you’ve begun to introduce others to the concepts. If you’re anything like us, you’ll soon be teaching kanban concepts and practices.

You could give your colleagues this book and say, “Talk to me again when you’ve read this!”¹ But we’ve found that running a concrete, practical exercise makes the concepts stick much better. This idea is loosely founded in the thinking behind experience-based learning defined by David Kolb (Experiential Learning, Prentice Hall, 1984, http://amzn.com/0132952610).² We often start our presentation with a game or exercise that shows a principle in action and then refer back to what was learned as we present the theoretical concepts in kanban. In the introduction, we play Pass the Pennies with the team to show them why they’d want to limit WIP.

For each game covered here, we add some tips, comments, and questions to get a discussion going and help the learning process. The following table shows a short summary of the games and the concepts we’ll talk about.

<table>
<thead>
<tr>
<th>Section</th>
<th>Game</th>
<th>Concepts taught</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.1</td>
<td>Pass the Pennies</td>
<td>Limiting WIP leads to shorter lead times.</td>
</tr>
<tr>
<td>13.2</td>
<td>The Number Multitasking Game</td>
<td>Limiting WIP leads to shorter lead times. Multitasking leads to lost time and poor focus and quality.</td>
</tr>
<tr>
<td>13.3</td>
<td>The Dot Game</td>
<td>Limiting WIP, tweaking the process toward even faster flow, collaboration. Little’s law and pushing more items into the system increases WIP, which in turn slows the flow down.</td>
</tr>
<tr>
<td>13.4</td>
<td>The Bottleneck Game</td>
<td>Improve flow in a system using the Theory of Constraints.</td>
</tr>
<tr>
<td>13.5</td>
<td>getKanban</td>
<td>Improve your process by using the kanban principles in practice.</td>
</tr>
<tr>
<td>13.6</td>
<td>The Kanban Pizza Game</td>
<td>Improve your process by applying the kanban principles, limiting WIP, and doing retrospectives in short increments.</td>
</tr>
</tbody>
</table>

That’s quite a few games, so let’s get going right away with a quick, practical game that shows why limiting WIP is a great idea.

¹ And by all means do!
² See also “What is experience-based learning?” at http://mng.bz/9fk1.


13.1 Pass the Pennies

Pass the Pennies (sometimes called Flip the Chip) was mentioned in chapter 1, when Marcus and Joakim played this game with the Kanbaneros. The game is a fast and engaging way to introduce the concept of WIP and show why limiting WIP is a good idea. As you may remember from chapter 5, limiting WIP will make your work flow faster through your process. After playing the game, you can have a discussion about limiting the WIP. What are the “pennies” that you’re passing around in your process? How do you go about limiting the amount of work? What would happen if you did?

We’ve seen a lot of eye-opening “Aha!” moments when playing this game with teams, and we’ve heard people bring up the game years after it was played. Pass the Pennies takes about 15 minutes to play, and you should allow at least 15 minutes more to discuss what you learned.

13.1.1 What you need to play the game

You need the following to play the game (including nine players, preferably):

- 4 workers who flip the coins
- 4 managers who time their worker
- 1 customer or project manager (can be played by you, the facilitator, if needed)
- 20 coins of equal size
- A table to play on
- 5 stopwatches (or phones with stopwatch applications)
- A whiteboard or flipchart to write results on

Make sure you’ve read about and understand the game and preferably have played it yourself, before you try to facilitate it. This goes for every game and exercise you run and teach to others.

13.1.2 How to play

The objective for each role is as follows:

- Workers—Flip all the coins and pass them to the next worker in line.
- Managers—Measure the effective time that each worker is flipping coins.
- A customer—Determines the total time in two aspects: the time it takes for the first coin to be delivered, and the total time (until the last coin is delivered).

The game is played in three iterations: 20-, 5-, and 1-coin batches. In each iteration, the game is played exactly the same, except that the WIP (batch size) is lowered. The goal, process, and order of the exercises stay the same.
Seat the workers around the table with a manager standing behind each worker. Instruct the managers to use the stopwatch to track the effective time the worker is working. Ask the customer to measure the time for the first coin delivery and the total time for all coins to be delivered.

When the first 20-coin iteration is underway, you’ll have plenty of time to draw a table for the result on the whiteboard, like the one at right. Wait to note down the results until the iteration is over. When all the results are added, pause for a moment for the players to reflect on them.

Each manager-worker pair can be allowed a short “motivational talk,” for fun.

Now tell the team that you’re not happy with the result and that you want run the next iteration with five coins. Be sure to remind everybody that the only thing changing is the WIP. Measure the whole time that each worker is working.
When the five-coins iteration is over, note the results. You can see the results we had with a team in the table to the left. The results will probably raise a few eyebrows, because the time to first delivery went down a lot: from 1:18 to 18 seconds in our example! The overall time was also greatly improved, dropping from 1:18 to just 40 seconds. Give the team a couple of minutes to talk and reflect on what happened.

Before long, though, you should start the final, one-coin iteration. Use the same goal and rules as before. When the last iteration is over (it goes by quickly), note down the result. You should end up with a table like this (with columns for 20, 5, and 1).

<table>
<thead>
<tr>
<th></th>
<th>20</th>
<th>5</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worker 1</td>
<td>0:20:6</td>
<td>0:25:5</td>
<td>0:21:2</td>
</tr>
<tr>
<td>Worker 2</td>
<td>0:10:5</td>
<td>0:23:5</td>
<td>0:21:7</td>
</tr>
<tr>
<td>Worker 3</td>
<td>0:13:4</td>
<td>0:26:4</td>
<td>0:24:6</td>
</tr>
<tr>
<td>Worker 4</td>
<td>0:25.0</td>
<td>0:24:7</td>
<td>0:32:6</td>
</tr>
<tr>
<td>First</td>
<td>1:18:0</td>
<td>0:18:9</td>
<td>0:04:8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1:18:0</td>
<td>0:40:0</td>
<td>0:37:0</td>
</tr>
</tbody>
</table>

Make sure to thank everybody for playing, and then start a discussion to analyze the results.

### 13.1.3 Questions for discussion

We often ask questions like these to trigger a discussion:

- What happened to the total time? Why?
- What happened to the time for each individual worker? Why?
- How did it feel to play the game? When was it stressful? When was it calmer?
- Can this game be translated into your work?
  - What are the coins in your work?
  - What isn’t applicable in your context?
  - What would happen if you lowered the number of “coins” in your context?
  - What’s hindering you from doing that?
  - What can’t be translated into your work situation?

Feel free to add other questions as you see fit or as the discussion wanders.
13.1.4 Main take-aways

From the previous result tables, you can easily see that the time for the first coin goes down a lot. This is typically what happens with small batch sizes that are moved through the value chain in a continuous flow.

For each individual worker, the times usually (but not always) trend upward. This can trigger a discussion about how, when you optimize for flow, resources may not be used 100%. You can talk about what the team is optimizing for or if it's important that everyone is fully utilized at all times.

This is also a good time to discuss lead time (from start to finish) versus cycle time (times for each individual worker). What are their customers interested in—finished stuff or great resource utilization?

13.1.5 Tips and variants

Someone will almost certainly object that this is a simplification, and it sure is. But the simulation is done to illustrate a principle: that less WIP (number of coins) makes your work flow faster through the process. How can that principle be translated into your work context? In the simplest form, the coins represent work items, although work items are often of different sizes and complexity. The principle of limiting WIP still applies, though. You can read more about that in chapters 5 and 6.

Pass the Pennies takes nine people to play. But you can slim it down in several ways and still make great use of it:

- Play with only three stations.
- Let the workers time themselves.
- You, the facilitator, can play the customer.

NOTE To the best of our knowledge, this game seems to have been created by a man called Joe Little, under the name Scrum Penny Game. There are a lot of variants (Flip the Chip, for example), and we’ve heard others mentioned as probable creators of the game: George Dinwiddie, Jeff Sutherland, and Henrik Kniberg.

13.2 The Number Multitasking Game

This game is a simple simulation that can be played with a single person. It shows that less WIP improves lead times and helps alleviate stress and pressure. Although a single player can play this game, we have scaled it to include up to 65 people.

This simulation is another way to illustrate the value of limiting WIP, but it has additional properties that we think make it a little more interesting. Pass the Pennies shows only one concept, but shows it well. The Number Multitasking Game is a bit more realistic and takes other aspects of your work into consideration. The discussion after the game will be about multitasking and the bad effects of having work pushed to

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you. That’s more realistic than Pass the Pennies, in our opinion. The game takes about 10 minutes to run.

### 13.2.1 What you need to play the game

You need the following to play the game:

- 3 different-colored pens per player
- 2 sheets of paper per player
- A manager who times each player (this role can be played by the facilitator, if needed)
- A stopwatch (or a phone with a stopwatch application)

### 13.2.2 How to play

Ask the people playing to help you with three *important* tasks that your company has coming up. Here are the tasks:

1. Write the roman numerals I through X in a column from top to bottom. Use a black pen for this task.
2. Write the letters A through J in another column from top to bottom. Use a red pen for this task.
3. Write the numbers 1 through 10 in a final column from top to bottom. Use a blue pen for this task.

Introduce all the tasks as top priorities and vital to the company’s survival. In the first iteration, you want to utilize the “resources” (the players) to the fullest and therefore want them to spend equal amounts of time on each project, because they’re all important. Instruct the players to write row by row. Here is an example of someone going through the first three rows:

<table>
<thead>
<tr>
<th>Roman numerals</th>
<th>Letters</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I – X)</td>
<td>(A – J)</td>
<td>(1 – 10)</td>
</tr>
<tr>
<td>I</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>B</td>
<td>2</td>
</tr>
</tbody>
</table>

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4 *Iteration* here means finishing all the tasks: the roman numerals, the letters, and the number columns.

5 This instruction seems hard for some people to grasp, so be sure they understand that you want them to write the numbers row by row.
The manager will time the players for each task as well as record the total time (when all the tasks are done). When the iteration is over, note the time for each task under it on the paper (or on the whiteboard). You’ll find that each task takes quite a long time to complete (usually over a minute) and that all of them are finished with just a couple of seconds in between. An example result is shown in the table to the right.

Leave a few seconds for reflection, but then move on to the next iteration. Explain that you’ve now thought it over, and it turns out the first task (roman numerals) is the most important one. The letters task is the second most important, and the numbers turn out to not be that important at all.

Ask the players to do it again, but this time focus on what’s most important first and finish it before continuing on to the next task. In other words, work column by column, like this:⁶

<table>
<thead>
<tr>
<th>Roman numerals (I – x)</th>
<th>Letters (A – J)</th>
<th>Numbers (1 – 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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⁶ You might have to be very specific here and say something like, “First all the roman numerals, then all the letters, and finally all the numbers. Column by column.”
As before, note the time for completing each project and the total time for all the projects to be completed. As you’ll notice, the times typically play out something like this table:

<table>
<thead>
<tr>
<th></th>
<th>Row by row</th>
<th>Column by column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roman</td>
<td>1:20:0</td>
<td>0:12:0</td>
</tr>
<tr>
<td>Letters</td>
<td>1:22:0</td>
<td>0:12:0</td>
</tr>
<tr>
<td>Numbers</td>
<td>1:24:0</td>
<td>0:08:0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1:24:0</td>
<td>0:32:0</td>
</tr>
</tbody>
</table>

Here you can see that the completion time for each individual task has dropped dramatically—from 1 minute 20 seconds to just 12 seconds for the roman numerals, for example. Also notice that the total time has been reduced from 1 minute 24 seconds to merely 32 seconds. Ask the players to point out these differences before you do for a better “Aha!” effect.

Be sure to thank the players for playing the game, and then start the discussion.

### 13.2.3 Questions for discussion

These are a few of the questions we use to start a fruitful discussion after playing this game:

- What happened to the total time? Why?
- What happened to the times for each individual project? Why?
- Was the first round harder? Why?
- Does the simulation resemble your work situation?
  - What are your individual projects?
  - What does “switching pens” represent in your context?
- How are projects prioritized at your company? Do you know what’s most important to work on right now?
- How many projects/different things are you working on right now?
- What happened to the quality of the produced result?
- How did the first approach feel? Did the second approach feel better?

### 13.2.4 Main take-aways

The results should show an improvement in lead time (total for all three projects). The time for the first project is dramatically improved, often by 70–80%.

Not only that, but quality is often improved as well. This has to do with the fact that you don’t have to switch tools (pens) in the second iteration. Most people also find it
quite hard to write the roman numbers from I–X, and the second iteration allows for more concentrated focus on each project. Writing the numbers 1–10 is easy for most.\textsuperscript{7}

Most people find the first approach much more stressful, due to the fact that they're switching tasks all the time. By reducing the amount of stuff going on at the same time, you not only increase the focus and quality of your work but also improve the lead time for each project.

\textbf{NOTE} This origin of this game was also hard to track down. It seems to have evolved from a lot of different agile simulations. The exercise resembles the Multitasking Name Game that Henrik Kniberg\textsuperscript{8} uses. Kniberg hints that he, in turn, has adopted his from other simulations he’s seen done by others—for example, Mary Poppendieck.

\section*{13.3 The Dot Game}

The Dot Game is a simulation of a software-development project that shows the benefits of limiting your WIP. It also has some additional features regarding software development that make it a bit more interesting than the two games we’ve looked at so far.

The Dot Game shows interesting developments for a software team that starts to limit WIP. First you see what happens with the flow, but it also shows how you can start to think about changing the way you work to help the work to flow (another of the kanban principles). The game takes about 45 minutes to run.

\begin{center}
\textbf{A WORD FROM THE COACH} This game is hard work at certain positions and can be stressful at times. Make sure everyone involved volunteers and that you keep it fun. We’ve had people grow angry during this game, and that’s not what you want. Make sure everyone understands the fun of it.
\end{center}

\subsection*{13.3.1 What you need to play the game}

You need the following to play the game:

\begin{itemize}
  \item 8 players (although you can play one role yourself)
  \item A table with 6 chairs for the 6 seated players
  \item A whiteboard or flipchart
  \item Loads of rectangular stickies—at least 300
  \item Little stick-on dots (colored labels) in 4 different colors (see section 13.3.7 for cheaper alternatives)
  \item A premade template that acts as the specification for what is to be made
  \item A project manager with a stopwatch to measure time
  \item A customer (this role can be played by the facilitator)
\end{itemize}

\textsuperscript{7} The record time for that is 2.8 seconds, done by an Avega Group employee.

\textsuperscript{8} See “The Multitasking Name Game – or How Long Does It Take to Write a Name?” at http://mng.bz/YR06.
13.3.2 How to play

You can have a little role-playing fun and introduce yourself as the owner of a factory that creates stickies with colored dots on them, like the one to the right (hold it up for the group to see).9

The goal of the exercise is to create as many of those dot-covered stickies as possible within five minutes. You have a well-thought-out and established process, and you’re now considering starting a factory in this room. The process calls for six willing workers. You ask people if they’re willing to help you. Introduce each role and describe its task. Invite volunteers to take a seat at the table. Here are the roles,10 in order of the process:

1. Business Analyst—Removes a sticky from the pack and hands it to the next worker.
2. Technical Analyst—Puts a yellow dot in the lower-left corner and hands the sticky to the next station.
3. Designer—Puts a red dot in the upper-right corner and hands the sticky to the next player.
4. UI Developer—Adds green dots in the other two corners and passes the sticky on.
5. Developer—Adds the two blue dots in the middle and passes it to the Tester.
6. Tester—Makes sure the produced items are up to quality standards. If so, the items are delivered to the customer.
7. Project Manager—Times the procedure. Place the Project Manager at a whiteboard or flipchart to note down the times. The Project Manager times how long it takes for the first delivery (the first thing that reaches the customer). The Project Manager also warns the team when only one minute is left and announces when time is up (after five minutes).
8. Customer—Accepts the finished items. We often play this role ourselves and put “pressure” on the team as needed to keep the exercise interesting and fun.

Seat people as shown in the diagram.

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9 This means you’ll have to create a template sticky before the game starts.
10 Feel free to use job titles from your current workplace if you like.
13.3.3 First iteration

When everyone is seated, once again show them the template sticky and put it in the middle of the table. Tell them that your process has been optimized for working in batches of five items: the Business Analyst takes five stickies from the pack and hands them to the Technical Analyst, who adds yellow dots to all five of them and hands them on to the Designer, and so on. Let them know you’re going to evaluate them individually. Each station should produce as much as possible and not care whether the following stations are keeping up or not. We want everyone to be effective, right?

Don’t answer too many questions (there often aren’t that many at this stage), but strive to get the first iteration going as soon as possible. The Project Manager kicks off the game by starting the timer. As soon as the game is started, take the Customer aside and tell them that only two things should be evaluated for acceptance of items:

- The dots at the edges should be as close to the edges as possible, but not over them.
- The blue dots in the middle should be as close together as possible but not overlap.

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11 The Customer can be instructed in advance if you have the time. Or play that role yourself.
Instruct the Customer to only answer direct questions and not give away the acceptance criteria unless asked specifically.

When the team is in the middle of playing through the first iteration, you can head over to them and motivate them to produce as much as possible. When the first batch of stickies arrives to the Customer, the Customer accepts or rejects the stickies based on the criteria described earlier. Don’t say anything as to why.

Make sure the Project Manager notes the time for the first delivery (which usually takes about two and a half to three minutes) on the whiteboard and warns the team when there’s one minute left.

When the iteration is over, ask the Project Manager to count the following:

- Number of completed items
- Number of accepted items
- Number of items in process (items “on the table” that weren’t delivered)

Note all of these results on the whiteboard in a table like this:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>First delivery</td>
<td>2 mins 22 secs</td>
</tr>
<tr>
<td># Done</td>
<td>13 items</td>
</tr>
<tr>
<td># Accepted</td>
<td>4 items</td>
</tr>
<tr>
<td>WIP</td>
<td>66 items</td>
</tr>
</tbody>
</table>

Explain to the team that you’re disappointed with their performance. The Customer wants these items. Badly! Can they please get their act together and go faster, already?

Stop here and ask the people how it felt and how it went:

- You should see a bottleneck piling up after the Business Analyst (who has an easy job). Why did that happen? Were there any other bottlenecks or uneven flows?
- What if the Tester found flaws? What could the Tester do about them? What should they have done?
- Ask the team about the acceptance criteria: are they known? Who knows about them? What can be done to find out the criteria? Have the Customer briefly answer any questions the team may ask, and then move on to the next iteration.
- What’s the value of all the items on the table that aren’t delivered? None, in the eyes of the Customer. They’re wasted.
13.3.4 Second iteration

Explain to the team that in a desperate attempt to improve the output and quality of this workforce, you’re going to try something really crazy: for the second iteration, you’ll change absolutely nothing about the process except the number of items worked on at the same time. They’ll work in batches of one, not five.

The Business Analyst takes one sticky from the pack and hands it down to the Technical Analyst, who adds a yellow dot and hands it down to the Designer, and so on. Work as before, but with one item at a time.

Start the next five-minute iteration when the team is ready. This time you can go around and make sure people are working as they should. Be sure to check the

**Little’s law in the Dot Game**

In the original game instructions, Little’s law is introduced (see chapter 5). We usually don’t do that, for two reasons:

- We often mess up the calculation in the heat of the moment.
- We think that the point comes across with the data presented on the whiteboard anyway.

But if you feel up to the counting challenge, you could tell the team that the time for the first delivery is quite misleading. Let’s see Little’s law in action using our numbers, as noted in the table we created during the first iteration.

<table>
<thead>
<tr>
<th></th>
<th>First delivery</th>
<th># Done</th>
<th># Accepted</th>
<th>WIP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 mins 22 secs</td>
<td>13 items</td>
<td>4 items</td>
<td>66 items</td>
</tr>
</tbody>
</table>

Little’s law teaches that cycle time is calculated as follows:

Cycle time = work in process / throughput

Throughput, in turn, is calculated as follows:

Number of items finished / time

With the numbers from the example, that gives us the following:

WIP: 66 items that were in the process

Throughput: 13 completed items / 5 minutes = 2.6 stickies per minute

Cycle time: 66 / 2.6 stickies per minute = 25.4 minutes per sticky!

That’s a big difference from the already-bad 2:22 minutes for the first delivery.

This can also be explained on the table by having people realize that a sticky removed from the pack needs to “travel through” all the stickies on the table. The first batch had no items in front of it and hence moved faster through the system.

13.3.4 Second iteration

Explain to the team that in a desperate attempt to improve the output and quality of this workforce, you’re going to try something really crazy: for the second iteration, you’ll change absolutely nothing about the process except the number of items worked on at the same time. They’ll work in batches of one, not five.

The Business Analyst takes one sticky from the pack and hands it down to the Technical Analyst, who adds a yellow dot and hands it down to the Designer, and so on. Work as before, but with one item at a time.

Start the next five-minute iteration when the team is ready. This time you can go around and make sure people are working as they should. Be sure to check the
delivered items for quality (or help the Customer). See that the Project Manager warns the team when one minute is left and lets them know when the time is up.

Note the results for the second iteration, which probably looks something like this:

<table>
<thead>
<tr>
<th></th>
<th>First delivery</th>
<th># Done</th>
<th># Accepted</th>
<th>WIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2 mins 22 secs</td>
<td>13 items</td>
<td>4 items</td>
<td>66 items</td>
</tr>
<tr>
<td>1</td>
<td>36 secs</td>
<td>28 items</td>
<td>17 items</td>
<td>29 items</td>
</tr>
</tbody>
</table>

Stop here and discuss the result:

- What happened with the time for the first delivery?
- What about the number of delivered items?
- Why did the quality (accepted items versus number of done items) improve? Somebody may say that this was easier during the second iteration because they now know what to do. That’s correct—and it’s also exactly the point that you want to make. They now know what to do because they asked the Customer during the discussions after the first iteration and adjusted to the new information, right?
- Where’s the bottleneck now? Who has a lot of items in front of them? Often the bottleneck appears in different positions than it did in the first iteration.

### 13.3.5 Third (and final) iteration

Announce your resignation to the team. It’s hopeless. You have no clue how to improve the process to produce any good results from this team. The team can now, all by themselves, come up with ways of improving the process in order to produce as much as possible and waste as few items as possible.

In our experience, many teams need some input here to get going. You could ask them who’s responsible for quality and what they should do about that. Or how they can make sure to waste as few items as possible. Team members may ask whether they can trade places, and you can allow that, but there is a penalty: people who trade jobs have to slow down on the new work to make it more realistic. A tester doing development probably won’t do it as fast as a developer.

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12 We’ve also seen some super-creative variants here, including walking around the table and having the Customer walk with the team, correcting mistakes and giving input as they walked. You’d be surprised at what people come up with. Allow them to think for a while before giving them hints.
Give the team a few hints, and then allow for three minutes of self-organization to get ready for the last iteration. If you have people in the room who aren’t seated around the table, make sure to ask them for input on improvements as well.

When the team is ready, run the third iteration as before: five minutes, warn when one minute is left, and time the first delivery. When the five minutes are up, you’ll end up with a table like this:

As the result is noted, start a discussion:

- How did that last iteration feel? Common answers are “chaos” or “unstructured.” Is that bad?
- What happened with the time for the first delivery? Usually it goes up a little bit. Why is that?
- What happened with the quality? It’s often improved greatly. Why?
- How much was wasted? Why?

Make sure to thank everyone for playing this quite stressful game, and end the session.

### 13.3.6 Main take-aways

This game shows a lot of things worth noting:

- With smaller batches, the lead time goes down and quality goes up.
- By doing a retrospective and adjusting the way you work after each iteration, you improve the result. Ask the team, after the last iteration, whether they think they would improve further if they got another try. Most teams say yes.
- You need to ask questions of and collaborate with the Customer to know what they want. A perfect specification isn’t enough.
- There’s no use pushing work into a system that’s overloaded. The first position in the first iteration is usually a great illustration of that. We’ve seen Business Analysts with more than 200 stickies ready to be picked up by the next station. This is what Mary Poppendieck calls “wishful thinking,” meaning those items will not happen (faster) just because you stack them there. In fact, they will slow the system down by increasing your WIP (read more in chapter 5).
13.3.7 Tips and variants

This game takes time. Allow one complete hour for the game, although you may run through it in 45 minutes. Take a break after the game. Here are a few additional thoughts:

- Don’t forget to create the template before you start.
- The green and blue dots run out first. If necessary, buy more—you’ll probably need those.
- To save money, you can run this game with the players drawing dots with colored markers instead of placing dots. Doing so adds some features to the game because errors can’t be fixed easily, and it’s harder to have the quality be consistent when it comes to size and form.
- If you have somebody else playing the Customer, make sure they aren’t too picky. That puts the focus on the wrong place. Take time to instruct the Customer before the session and make sure that only the set acceptance criteria are taken into consideration.
- Take notes of any comments during the iterations. The comments can then be revisited during the discussions.
- Invite any people who weren’t playing the game to join the conversion, but only after each round. You don’t want them to interrupt the players in miditeration.
- In the retrospectives between rounds, give everybody plenty of time to talk. This is where learning takes place. Let the players talk first; the people looking on (if any) can talk after that.

**NOTE** Al Shalloway of Net Objectives created this game. He based it on the Lean Manufacturing Cup Game. He also kindly reviewed this section for us, for which we’re grateful.

13.4 The Bottleneck Game

The Bottleneck Game effectively teaches the five focusing steps from the Theory of Constraints (see chapter 7). The Theory of Constraints views a process as a system with at least one bottleneck (constraint) that slows production down. The five focusing steps are techniques that help identify, elevate, and manage the bottleneck(s) to get a better flow.

This Bottleneck Game resembles the Dot Game in some ways but is a bit more elaborate. It focuses more on bottlenecks and the Theory of Constraints’ way of approaching problem solving.

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14 Martin Boersema, “The Lean Cups Game – What’s summer without a few cold ones?” at [http://mng.bz/0Von](http://mng.bz/0Von).
15 Duh! With a name like that, we kind of knew …
The game is well documented. You can download it for free from [www.agile-coach.net/coach-tools/bottleneck-game/](http://www.agile-coach.net/coach-tools/bottleneck-game/).

### 13.4.1 What you need to play the game

This is a team exercise, and each team consists of from four to seven people:

- You need plenty of space for each team in a long production-line format.
- Print the instruction sheets from the website to distribute to each player according to their role.

### 13.4.2 How to play

The game is played in three rounds, with concepts being introduced as part of the game. The complete game takes about two to three hours to play and can be extended with a workshop that applies the things you’ve learned to real-world situations.

The goal of the Bottleneck Game is for each team to create as many pairs of paper hats and boats (like the pair to the right) as possible and at the same time make sure not to waste paper. The suggested game process is set up to reveal some bottlenecks. The presentations and tutorials help the attendees to use the five focusing steps (from the Theory of Constraints) to resolve these bottlenecks.

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**The five focusing steps**

The five focusing steps are based on the simple premise that there’s at least one bottleneck in your system. If there weren’t, the flow through the system would be totally unrestricted, and the throughput would be instant and unlimited. Any improvement made to the biggest bottleneck is an improvement of the throughput for the entire system.

Here are the focusing steps to follow to manage a bottleneck:

1. Identify the constraint that slows down the throughput. For example, testers are always overloaded with work.
2. Exploit the constraint so that it’s used to its full capacity. For example, make sure the testers only do testing and nothing else.
3. Subordinate other activities to the exploitation of the bottleneck. For example, make some other function do the non-testing work to help the testers out. This is OK because the other function isn’t the bottleneck.
4. Elevate the constraint. For example, have other functions do testing too, or hire new testers. This is often slow and expensive, so don’t try this until you have tried the first three steps.
The process that is simulated is optimized further and further into the game to manage the bottleneck to achieve a quicker and smoother flow.

### 13.4.3 Questions for discussion

The extensive material supplied on the game’s website gives you a lot of suggested discussion topics and guidance on running the subsequent workshop with which you can extend the session. The material contains a complete and extensive session handbook for instructors, job instructions for workshop attendees, and ready-made handouts for attendees to keep.

### 13.4.4 Main take-aways

The main things the Bottleneck Games reveals are as follows:

- How a bottleneck can be managed by using of the five focusing steps from the Theory of Constraints.
- How the Theory of Constraints, and what you’ve learned in the exercise, can be applied to a real situation.

**NOTE** This game is released under the Creative Commons Attribution-Share Alike by Pascal Van Cauwenberghe and Portia Tung. The game and all needed material can be downloaded at [www.agilecoach.net/coach-tools/bottleneck-game/](http://www.agilecoach.net/coach-tools/bottleneck-game/).

### 13.5 getKanban

getKanban is a full-fledged kanban simulation that in itself is an introduction to kanban and its principles. The game is a fairly complex board game with excellent documentation. You should probably play it at least once with someone else before trying to facilitate it yourself.
The game comes in three modes: quick play, standard, and advanced mode. Each mode is increasingly more detailed and hence takes more time to play. You should allow at least two and a half to three hours for the advanced mode and should include a short introduction to kanban before starting the game.

getKanban costs money16 and can be ordered from www.getkanban.com. It’s well worth the investment. You can also print the game materials from earlier versions of the game yourself, for free.

The getKanban game is ever-evolving, and you can expect updates to the game continuously. The version we briefly describe here is version 4.

13.5.1 What you need to play the game

You need the following to play the game:

- The getKanban board game. All necessary materials are included in the box.
- About 6 players per board (minimum of 4 players to make the game interesting).
- A big clear table space.
- A whiteboard or flipchart to track results and explain concepts is useful.

13.5.2 How the game is played

Giving complete instructions on how to play getKanban is well beyond the scope of this book. That’s described in the getKanban game itself. Consider this section a short introduction to the game.

In the game, you play a software-development team that creates a product that customers are subscribing to—for example, an online service. The official objective of the game is to gain as much money as possible, but other objectives can be used too, such as finishing as many items as possible, for example.

You play through a number of days with the software-development team, starting a couple of days into an ongoing project, so you’re thrown directly into the action. Progress is determined by the throw of a pair of dice—the higher the rolls, the more work (analytics, development, or testing) is done by the team. The work effort can be rerouted, so that development work values can be used in testing, for example, as part of team strategy.

Throughout the game, event cards are introduced with features the team needs to take into consideration. There will be bad bosses making “stupid” policies that throw the plans overboard, conferences that can give you additional subscribers, and some work with value that’s not determined until later in the game.

Each round follows a strict schedule that helps you play through the round, update your earnings, and see some metrics and draw diagrams to help keep track of your progress. It’s all very detailed and easy to follow and can in itself be a great introduction to the diagrams and metrics used in kanban.

16 $450 per game at the time of writing.
The team strategy in picking which items to focus work on and how to distribute the work (values from the dice) determines whether they’re successful or not.

### 13.5.3 Questions for discussion

There are ample opportunities for discussion during the game, but in the end a wrap-up discussion should focus on the following:

- What did you learn?
- How can you apply this in your current context?
- What surprised you about how the game played out?

### 13.5.4 Tips and variants

You can change things when you run this game if needed. Here are a few of the tweaks that we have used or seen:

- As a facilitator, you should be ready to walk around the group and help them, answering questions and giving them tips. The game has quite a few rules, and following them all during the first run-through has proven a daunting task for most groups with whom we’ve tried the game.
- Set aside plenty of time for playing this game. An introduction to kanban is probably needed before you play. The game takes at least 90 minutes to play. You should probably set aside at least 30 minutes to discuss the game with the attendees afterward. All in all, the session may last two and a half to three hours, if you include breaks.
- Although the game is controlled in part by the event cards, you can play it more than once. Different focus and strategies and how they affect the outcome are interesting variants you can introduce.
- You can play an online version of the game by yourself at [https://getkanban.corporatekanban.com](https://getkanban.corporatekanban.com). It’s both cool and a bit awkward and sad, we know, but it can be a good way to run the exercise to prepare yourself, or to point people to for follow-up.

### 13.5.5 Main take-aways

The main take-aways from the getKanban games, for us, are these:

- See kanban in action for real. The game touches on a lot of areas of using kanban and the principles kanban builds on. The concept of limiting WIP and the pull principle (pulling work into action just in time rather than keeping a stock of work, just in case) are shown in practical use.
- How a kanban board works and can be laid out.
- How to build and use metrics and diagrams such as cumulative flow diagrams and control charts.
How to use the metrics and information created by the process to optimize business outcome.

**READ MORE** At [www.getkanban.com](http://www.getkanban.com), you can read much more about this game. Although the game is for sale, it’s also open-sourced, and you can contribute to its progress.

### 13.6 The Kanban Pizza Game

This is another kanban simulation game that can be obtained (for free) from the Agile42 website ([http://mng.bz/kYN7](http://mng.bz/kYN7)). The game takes about an hour to play, making it quicker than the getKanban game, and can be played with less preparation. It does require a lot of props, and you probably need someone to help coach the team during the game to reach its full potential.

The game is quite fun and easygoing. It’s a perfect team-building exercise\(^\text{17}\) that also teaches something useful. The overarching objective is for the team to “feel” how kanban works in practice.

#### 13.6.1 What you need to play the game

The Kanban Pizza Game website has lots of information on what you need to get started. Quite a few things are listed, but nothing that you wouldn’t find in most offices or office-supply stores.

Besides the props, you’ll also need the following:

- 5 players per team (4 players could also work).
- A game leader (who has experience playing the game).
- A table to play on: one table per team that can accommodate all team players easily. A lot of pizza is going to be shuffled around on the table.
- A whiteboard or flipchart for reporting.

#### 13.6.2 How to play

The objective of the game is to create pizza slices (which add points) but avoid wasting pizza slices that don’t get done (which deduct points). The Customer orders complete pizzas, and the team only gets points for fully completed orders. The team with the most points wins.

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\(^\text{17}\) Because it quite naturally builds up an appetite for pizza, the session can be rounded off with pizza for everyone. Not the paper version, though.
The simulation leader takes the role of someone who opens a new pizza restaurant and hires the players to work for them. All the materials and tools for creating pizza slices are supplied to the team.

The game is then played in four iterations, as follows:

1. Bake/create pizza slices any way the team feels like, in an arbitrary process.
2. Introduce the concept of “orders” (batches of slices) and workstations that physically limit WIP.
3. Introduce a product variation in the form of a pizza with a different recipe and workflow.
4. With all the parts of the game in place and the experience the team has acquired from the previous three iterations, let them self-organize and come up with process improvements.

After the formal game, continue to a debriefing session to lock in learning points from the game.

### 13.6.3 Questions for discussion

You can use questions like the following to open up a discussion after running this game:

- What happened to lead time as you introduced WIP limits? Why?
- Did you feel stressed? How can you improve on that?
- What happened when a new product was introduced?
- What similarities or connections can you make to how you work?
  - What are the pizza slices?
  - What about the board?
  - Who’s ordering pizzas?

The creators of the game also suggest that you keep going from here and start to create your own visualized workflow with the principles learned in the game. It sounds like a great idea but will probably require some coaching or help to handle questions that might arise. In this way, the game can be used as a lead-in for the team to start using kanban for their work.

### 13.6.4 Main take-aways

These are the goals of the game:

- Experience kanban and the kanban principles in action.
- Understand and experience the effect of limiting your WIP.
- Inspect your process, and self-organize to improve the process.
- Create a kanban board to reflect your workflow.

To be able to get a feel for how a pull system works in practice is a great thing that’s pretty hard to do. That’s what this game accomplishes.
There’s quite a lot of documentation on the website, but to get the full potential out of the game, you need to have hands-on experience. You’re probably best off playing the game for yourself with some friends before trying to run it with others. Better yet, find someone who has experience running the game, and have them run it with you.

**NOTE**  The game was created by Agile 42 (www.agile42.com) and is licensed under the Creative Commons Attribution-Share Alike 3.0.

### 13.7 Summary

This chapter showed you some games and simulations that can help you introduce the main concepts of kanban to people who haven’t heard about it before. In our experience, games like these are great ways to learn kanban and the principles it’s built on. We’ve overheard people talking about the Dot Game they played a year ago when discussing a problem with the flow on their board. And we’ve heard people remind each other to not make “more pizzas than the system can currently handle.”

Although the games are important, what’s most valuable is the discussion that follows. Make sure you’ve prepared a lot of questions to pose to your team. You want them to reason about what happened and transfer that to their work lives.
Too much work and too little time? If this is daily life for your team, you need kanban, a lean knowledge-management method designed to involve all team members in continuous improvement of your process.

Kanban in Action is a practical introduction to kanban. Written by two kanban coaches who have taught the method to dozens of teams, the book covers techniques for planning and forecasting, establishing meaningful metrics, visualizing queues and bottlenecks, and constructing and using a kanban board.

What’s Inside
• How to focus on work in process and finish faster
• Examples of successful implementations
• How team members can make informed decisions

Written for all members of the development team, including leaders, coders, and business stakeholders. No experience with kanban is required.

Marcus Hammarberg is a kanban coach and software developer with experience in BDD, TDD, Specification by Example, Scrum, and XP. Joakim Sundén is an agile coach at Spotify who cofounded the first kanban user groups in Europe.

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