



8 COOL COLOR SCHEMES

TO IMPROVE YOUR
JOB SHOB SCHEDULING



TABLE OF CONTENT

INTRODUCTION

KEY CUSTOMER

CUSTOMER SEGMENTS

LATE KEY CUSTOMER ORDERS

WAITING TIME VIEW

BOTTLENECKS

TOOL DEPENDENCY

NO FAULT TOLERANCE

EXECUTION VIEW

ABOUT COLOR



INTRODUCTION

WHAT THIS EBOOK IS ABOUT AND WHO SHOULD READ IT

If you are reading this Ebook, chances are you're either a production scheduling professional or a machine/job shop owner who understands the importance of proper scheduling.

You are most likely looking to increase performance and have read that fast communication can help. You have heard that by color schemeing you can achieve a faster understanding of the scenario and you want to read in depth. Color coding, in fact, is putting an order in the space.

This Ebook provides you with answers on how to color code effectively. Mind you, it is not a guide on "what color goes well with which"; it is an approach on what certain colors to pair together in order to highlight certain jobs. In addition to this, this Ebook offers an overview on the color theory that underlies behind each color choice.

It should also be noted that when primary colors are discussed during the Ebook, we are refering to the tangible take on the colors; therefore these are blue cyan, magenta and yellow.

ABOUT THE AUTHOR OF THIS EBOOK



Clara works as content Marketing intern in the just plan it team at NETRONIC. With a solid background in Fine Arts and creative writing, she brings new perspectives to the team.

KEY CUSTOMER

WHY THIS COLOR SCHEME IS RELEVANT

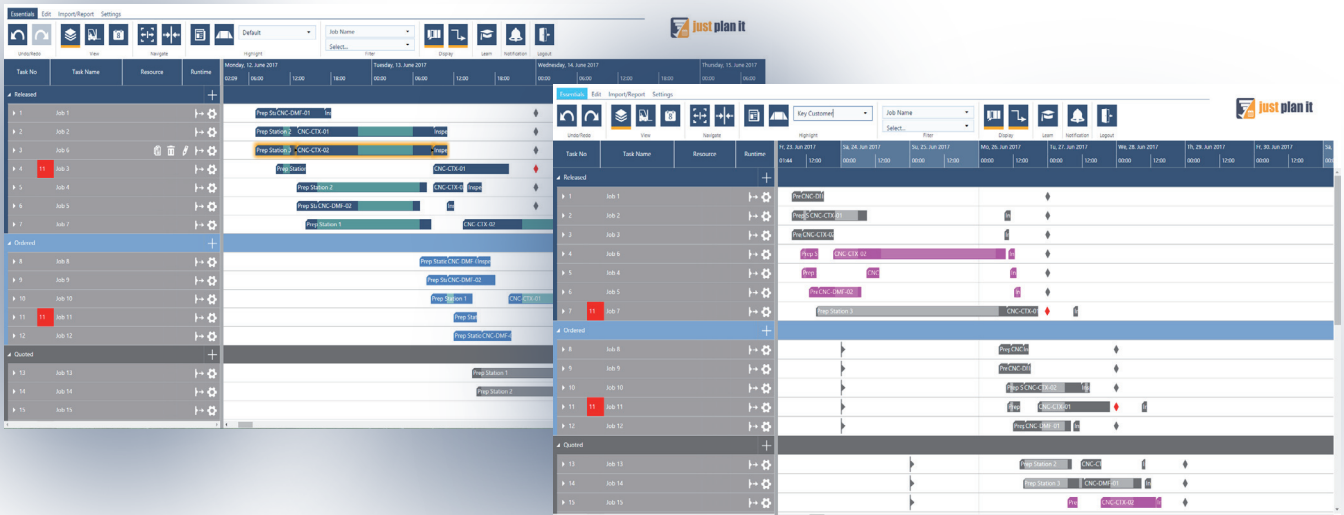
Sometimes you have a situation, in which two jobs compete for the same resource and you have to accept that one job will have to be completed past the due date. In case you do not want to temporarily increase your capacity, you have to make the hard decision, which job you will make in time and for which job you have to live with being late.

We are sure that there are hundreds of rules that are applied to deal with such a situation and to make the best decision. However, one common rule is that not all customers are equal. In case that one of the two critical jobs is for your one and only number one customer, you want to make 100% sure that this job will not finish late.

It might be a bit cumbersome to look for the (key) customer's name in the info window that pops up when your mouse hovers over a job. So, you better create a color scheme to **highlight all jobs for your key customer.**

BEFORE & AFTER

On the left hand you see how your schedule might look like with the default color scheme. Basically, you need to make the decision if Job 5 or Job 7 should run late.



After applying a “key customer” color scheme, the same schedule can look like this. You see that it is good to get Job 5 done in time as it is a key customer job (highlighted in magenta).

HOW TO BUILD THIS COLOR SCHEME

This color scheme is meant to highlight jobs from just one customer. That means you need to select “customer” as the filtering property, select your key customer as value (here: “Smith & Sons”) and then choose a color.

Manage Color Scheme: "Key Customer" ×

☐ Extend default +

If	Value	Color
<div>Customer × ▾</div>	<div>Smith & Sons × ▾</div>	<div><div></div> ▾</div>

RECOMMENDED COLORS

As grey is a combination of black and white thus, not a color in the theoretical term of the word (black and white are not considered colors; white is light and black is the absence of color), any bright color will stand out placed near it.

The best way to ensure a color stands out is by using primary colors. Primary colors are the ones which exist by themselves as they are. They cannot be created by mixing hues; therefore when placed by a grey color, the eye fully catches them.

R: 255
G: 0
B: 255

R: 255
G: 255
B: 0

R: 0
G: 255
B: 255

CUSTOMER SEGMENTS

WHY THIS COLOR SCHEME IS RELEVANT

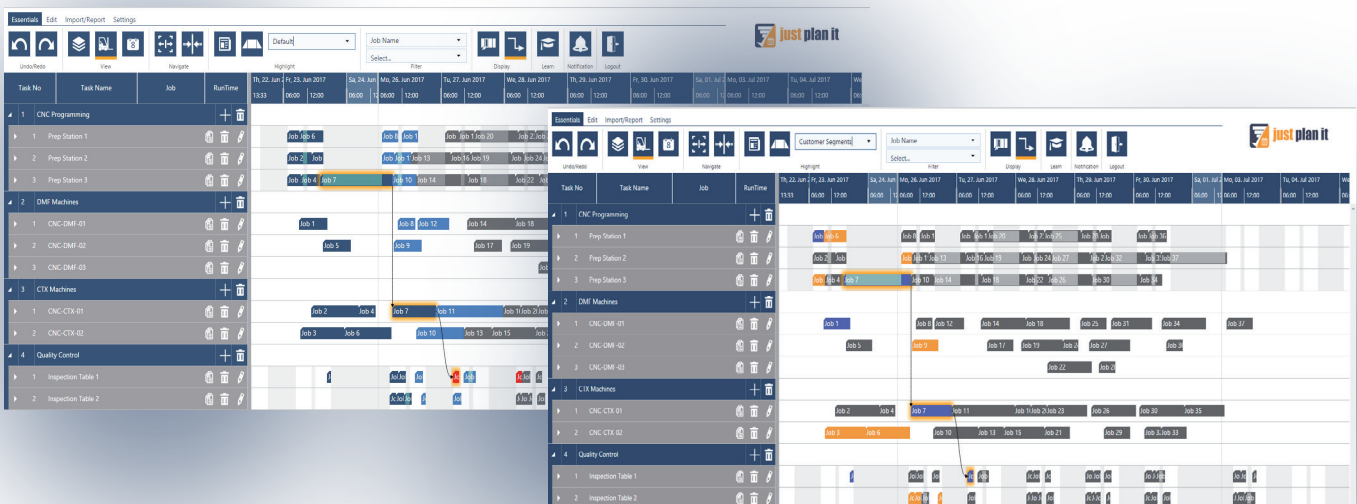
There might be cases that a color scheme by one or a few named customers does not do the job for you: e.g. if you have too many important customers and you do not want to fiddle around with too many colors.

Chances are high that you tend to think and act in customer segments, e.g. differentiating Tier 1 and Tier 2 customers from all the others. So if you want to gain a quick overview how you are doing with your Tier 1 and Tier 2 orders compared to the rest, you should build a color scheme accordingly.

Again, such an overview will quickly guide you to any issue in your plan – e.g. if a Tier 1 order runs late while an ordinary order will be ending in time, using the same resource that the Tier 1 order would also require.

BEFORE & AFTER

Here is how your schedule might look like with the default color scheme. You see that Job 7 runs late, but miss any contextual information in terms of the customer tier.



After applying a “customer segment” color scheme, the same schedule can look like this. You see that Job 7 is a Tier 1 job (highlighted in purple), and that it has to wait for two ordinary jobs (displayed in grey) before it starts. This is your call to action!

HOW TO BUILD THIS COLOR SCHEME

This color scheme is meant to highlight jobs from Tier 1 (purple) and Tier 2 (orange) customers. As customer tiers are no default values in just plan it, you first have to define them as so called “color as” values.

Manage "Color As" Values

<input type="checkbox"/>	Values
<input type="checkbox"/>	Tier 1 customer
<input type="checkbox"/>	Tier 2 customer

After that, you can define the respective color scheme “customer segment” by selecting “color as” as filtering property (individually for each tier), selecting the respective tier as value and then choose a suitable color.

Manage Color Scheme: "Customer Segments"

☐ Extend default

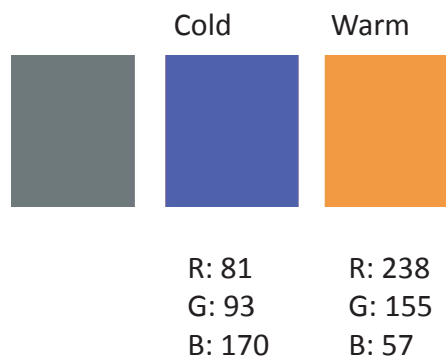
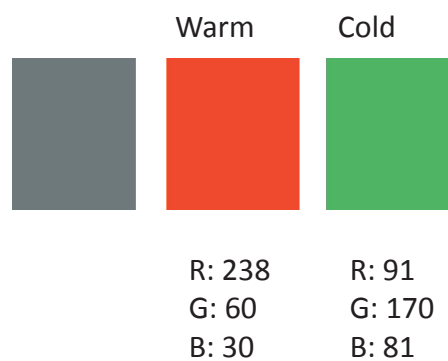
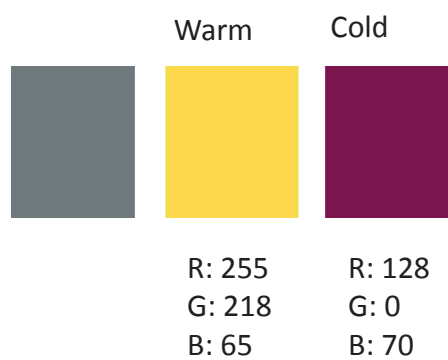
If	Value	Color
ColorAs	Tier 1 customer	
ColorAs	Tier 2 customer	

RECOMMENDED COLORS

When facing the task of picking two colors the choice is rather simple. Complementary colors. That one tone that is going to contrast making both colors easily visible. They act as opposites, setting an aesthetical balance and making sure the eye cannot miss them.

Another option is choosing a warm color and a cold color, but this again, falls into the complementary color paradigm.

Here are a few examples that work well when combined together. They are complementary and belong to the warm and cold range:



LATE KEY CUSTOMER ORDERS

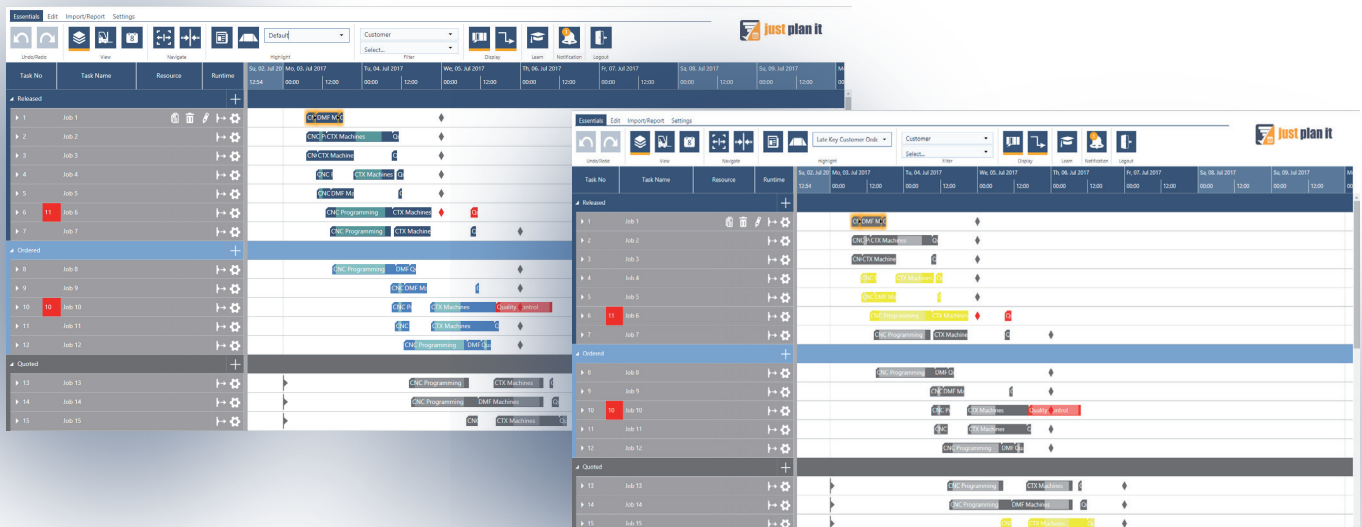
WHY THIS COLOR SCHEME IS RELEVANT

This color scheme is an extension to the “key customer” color scheme. In addition to giving all tasks of a key customer order a custom color, it allows you to still use an alerting color for all tasks that end after the job’s due date.

That way, you can see at one glance if any orders for your beloved no1 customer run late.

BEFORE & AFTER

This is how the schedule looks with the applying the default color scheme. You see that Job 7 runs late, but you do not have a contextual information with respect to your key customer.



After applying a “late key customer orders” color scheme, the same schedule can look like the right hand schedule. You still see that Job 6 is late (last task is colored red), but you now also see that this Job 6 is for your no1 customer (all other tasks colored in purple).

HOW TO BUILD THIS COLOR SCHEME

Here is how to get this color scheme going:

Manage Color Scheme: "Late Key Customer Orders" ×

☐ Extend default +

If	Value	Color
Customer	Smith & Sons	
DueDate	Exceeded	

RECOMMENDED COLORS

First of all, we recommend using a warning color for late jobs. As red is the international color code for warning, our suggestion is that the color choice falls along that range. We also recommend that the next color choice makes a contrast with that red, otherwise the visual understanding might not be immediate.

However, if your intention is to create a state of awareness, we recommend saturated colors, as they will be hard to miss.

R: 255
G: 35
B: 24

R: 255
G: 251
B: 23

R: 255
G: 35
B: 24

R: 76
G: 255
B: 23

WAITING TIME VIEW

WHY THIS COLOR SCHEME IS RELEVANT

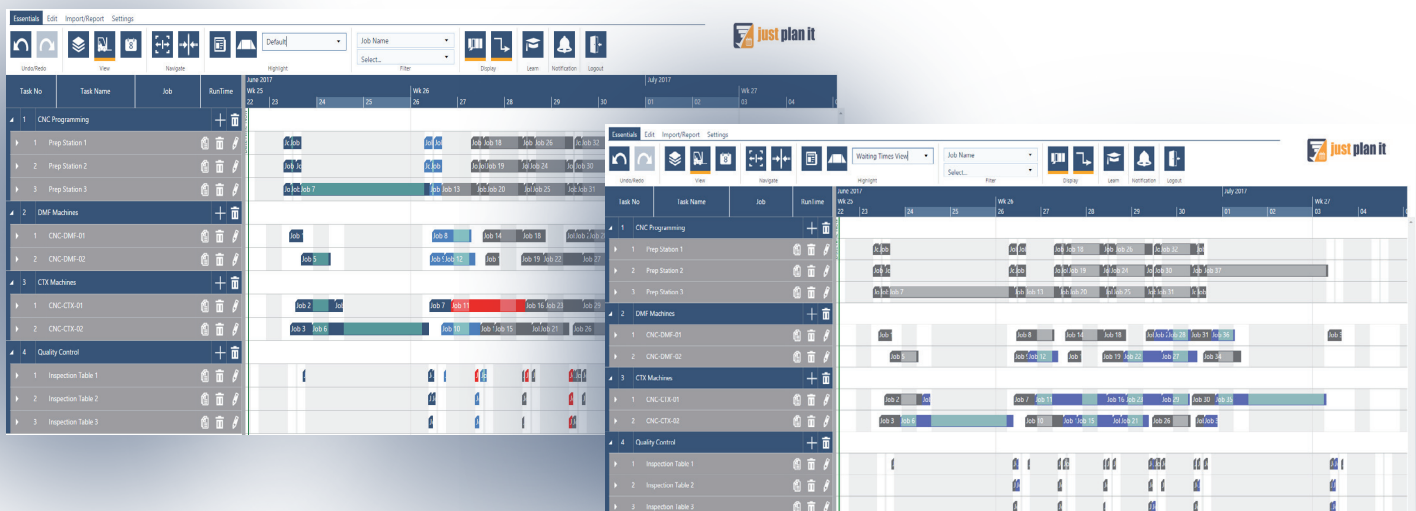
Waiting times are an interesting and important phenomenon in any job shop. Within just plan it, we define the waiting time per job as total throughput time minus total non-working time minus total runtime minus total transfer time. In essence, the waiting time tells you the total time (starting at the planned start date) that this job has to wait due to other jobs having a higher priority.

Generally spoken, waiting time is not a bad thing. If you - literally! - look at this from the Resource View (means from the perspective of your machines), it is the waiting time that helps achieving a high utilization of your resources, with one task lining up after the other. If there is just waiting time, it tells you that you seem to have a solid amount of orders to keep your resources busy.

However, if the waiting times become too long, jobs may run danger to finish late. Hence, it is recommended to keep an eye on the waiting times ... and hence define a color scheme accordingly.

BEFORE & AFTER

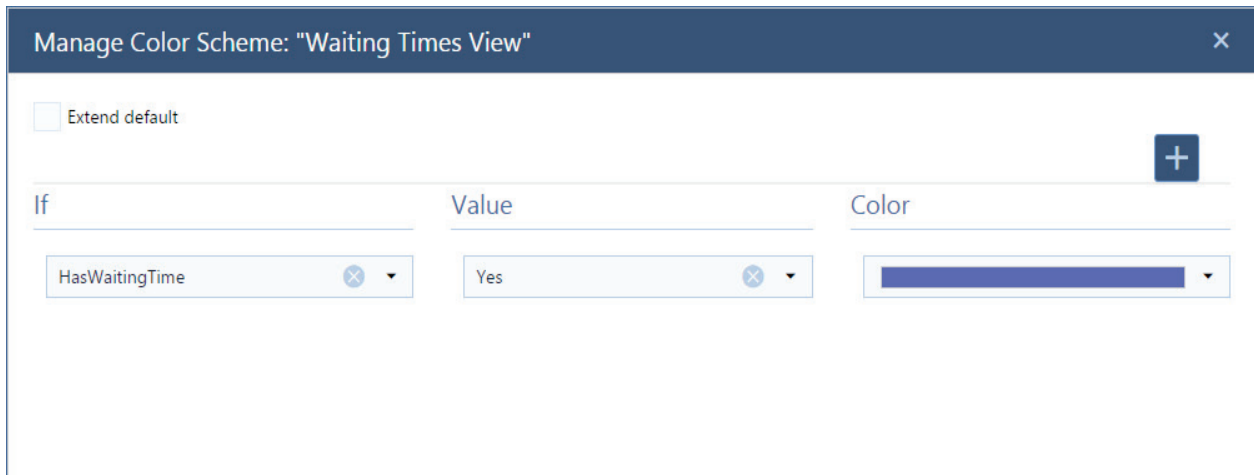
This is how the schedule looks with the applying the default color scheme. You see that basically all resources seem to be comparably well loaded with jobs and tasks.



After applying a “Waiting Time View” color scheme, the same schedule can look like the above. Tasks with waiting time are shown in purple. You might recognize that you have the most tasks impacted by waiting times lining up in resource group CTX Machines, but that there also some jobs waiting in the resource group DMF Machines.

HOW TO BUILD THIS COLOR SCHEME

Here is how to get this color scheme going:



If	Value	Color
HasWaitingTime	Yes	[Blue Color]

As “if parameter”, please select “HasWaitingTime” and then choose “yes” as the value. Now you just need to pick a color for those jobs that have waiting times, and you are ready to go.

RECOMMENDED COLORS

For the waiting time we recommend a slightly subtle color, as there might be other priorities that require a more immediate attention. This choice of color does not clash with those more vibrant, needed to indicate area of focus.



R: 81
G: 92
B: 171

BOTTLENECKS

WHY THIS COLOR SCHEME IS RELEVANT

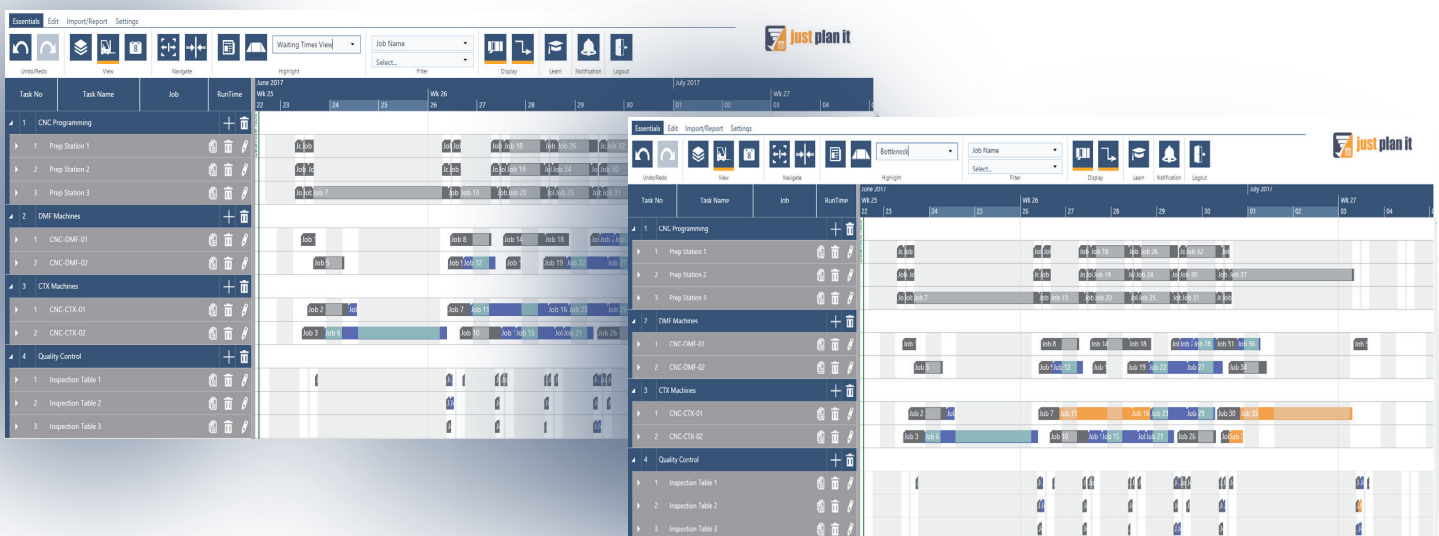
This color scheme is closely related with the “Waiting Times View” color scheme and we highly recommend that you make yourself familiar with this color scheme before. As outlined when generally dealing with waiting times, they can become an issue if they cause jobs running late.

In that case, waiting time feels like “wasted time” and then turns into an indication of a bottleneck in your production flow. Hence, you should somehow focus those resource that process jobs with waiting times that also run late. If there are resources in your shop that are needed to process jobs with waiting times that run late, you have a clear indication that these resources are the bottlenecks in your shop.

Let’s have a look

BEFORE & AFTER

At the left hand side you see is how the schedule looks with the applying the color scheme “Waiting Time View”. You see that you have the most tasks impacted by waiting times lining up in resource group CTX Machines, but that there also some jobs waiting in the resource group DMF Machines.



At the right hand side, I apply a new color scheme to the schedule. This time, the color scheme highlights jobs with waiting time (purple) and jobs with waiting time and running late (orange).

You can clearly see that you have an issue in the resource group “CTX Machines” as the waiting times in the other resource groups do not cause that huge amount of delays.

HOW TO BUILD THIS COLOR SCHEME

Here is how to get this color scheme going:

If	Value	Color
HasWaitingTime	Yes	Blue
HasWaitingTimeAndJobsOverDue	Yes	Orange

Now you need to use two parameters and assign the colors accordingly: Go for

- HasWaitingTime and
- HasWaitingTimeAndJobsOverDue

RECOMMENDED COLORS

As you need to clearly differentiate both segments, the best way to visually enhance them is by pairing complementary colors together. Here are a few examples:



R: 81	R: 238
G: 92	G: 155
B: 171	B: 57



R: 255	R: 128
G: 218	G: 0
B: 65	B: 70



R: 238	R: 91
G: 60	G: 170
B: 30	B: 81

TOOL DEPENDENCY

WHY THIS COLOR SCHEME IS RELEVANT

Sometimes, you might want to assign *two* resources to **one** task – such as a machine and a specific tool that you need to use for that specific job at that machine. For the time being, this is not feasible with just plan it as the software was built with the assumption of 1 resource per task. Well, it is no surprise that this feature of ‘n resources per task’ had been requested by quite a few of our clients and hence it made its way to our development plan.

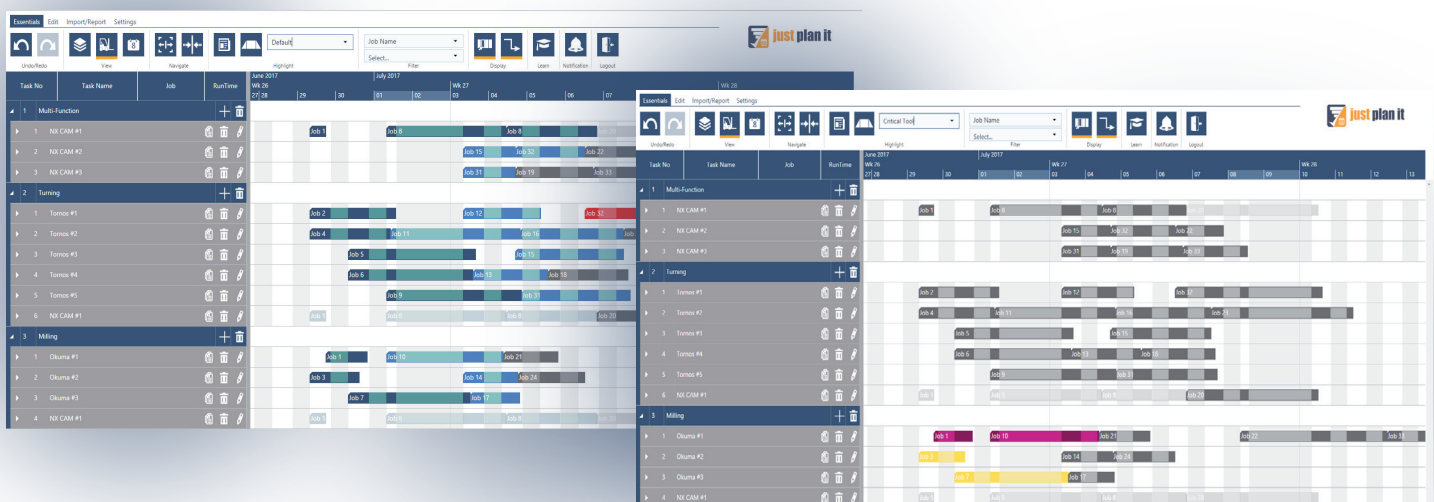
Until this functionality ships, you can use a color scheme to highlight the information if a specific tool is needed to perform a certain task. This is especially useful if your machines are your no1 resource type to take care of, and if the tools are treated as a kind of secondary resource type. In that case, we recommend specifying your crucial tools as “color as” values and then work with a color scheme that highlights tasks which depend on the availability of a certain tool. That way, you can see faster if one tool is required for two tasks at the same point of time.

Let’s have a look.

BEFORE & AFTER

Here is how the schedule looks with the default color scheme. It looks pretty straight forward and I cannot see any big issues – with the exception of a few jobs running late.

On the right hand you see how it looks when applying the color scheme “Critical Tool” to the schedule. With this color scheme, I use two colors (yellow and purple) to highlight tasks that depend on a certain tool (each color representing one dedicated tool).



You can clearly see that you have an issue with one tool represented by the yellow bars as these bars overlap, which means that two tasks need the same tool during a similar timeframe. The other tool (colored in purple) does not seem to cause any issue.

HOW TO BUILD THIS COLOR SCHEME

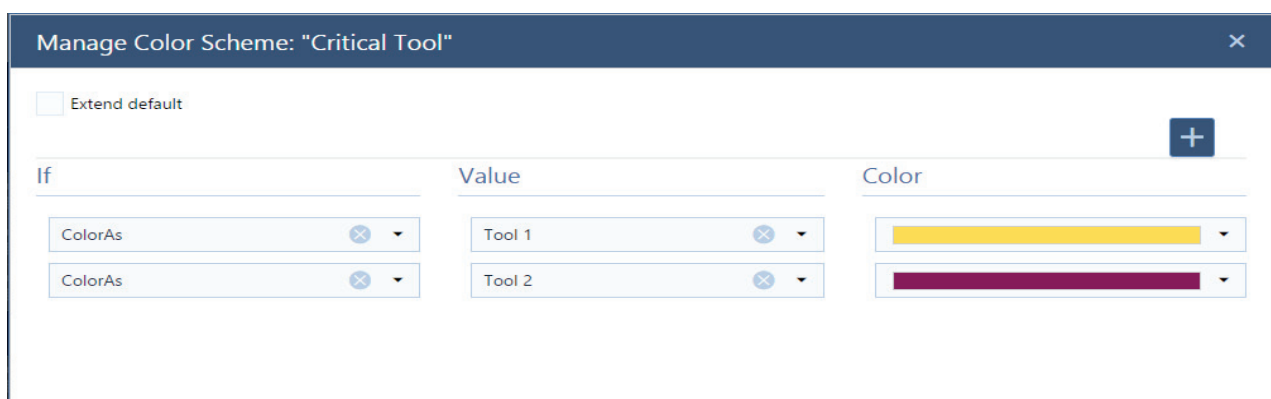
This color scheme is meant to highlight tasks that require tool 1 (yellow) or tasks that require tool 2 (purple). As tools are no default values in just plan it, you first have to define them as so called “color as” values.



The screenshot shows a dialog box titled "Manage 'Color As' Values". It has a close button (X) in the top right corner. Below the title bar, there are two buttons: a trash icon and a plus sign (+). The main area contains a table with a checkbox in the first column and a list of values in the second column. The values are: Values, Started, Paused, Finished, Important, Tool 1, and Tool 2.

	Values
<input type="checkbox"/>	Values
<input type="checkbox"/>	Started
<input type="checkbox"/>	Paused
<input type="checkbox"/>	Finished
<input type="checkbox"/>	Important
<input type="checkbox"/>	Tool 1
<input type="checkbox"/>	Tool 2

After that, you can define the respective color scheme “critical tool” by selecting “color as” as filtering property (individually for each tool), selecting the respective tool as value and then choose a suitable color.



The screenshot shows a dialog box titled "Manage Color Scheme: 'Critical Tool'". It has a close button (X) in the top right corner. Below the title bar, there is a checkbox labeled "Extend default" and a plus sign (+) button. The main area is divided into three columns: "If", "Value", and "Color". The "If" column has two rows, both with "ColorAs" selected. The "Value" column has two rows, with "Tool 1" and "Tool 2" selected. The "Color" column has two rows, with yellow and purple colors selected.

If	Value	Color
ColorAs	Tool 1	Yellow
ColorAs	Tool 2	Purple

Here is how you can specify the color as value “tool 1” for a dedicated task:

The screenshot shows a 'Manage Task Details' dialog box with the following fields:

Task No: *	10	Task name:	Milling
Setup time [hrs]:	0	Production time per unit [hrs]:	20
Teardown time [hrs]:	0	Transfer time [hrs]:	0
Resource:	Select...	Resource group: *	Milling
Time constraint:		Predecessors:	
Job view bar text:	Select...	Resource view bar text:	Select...
Color as:	Tool 1	Progress [%]:	0
Note:			

RECOMMENDED COLORS

As you need to clearly differentiate both segments, the best way to visually enhance them is by pairing complementary colors together. Here are a few examples:



R: 81
G: 92
B: 171

R: 238
G: 155
B: 57



R: 255
G: 218
B: 65

R: 128
G: 0
B: 70



R: 238
G: 60
B: 30

R: 91
G: 170
B: 81

NO FAULT TOLERANCE

WHY THIS COLOR SCHEME IS RELEVANT

From some clients, we heard that they have jobs for which they have to purchase very expensive material. This typically puts everybody involved in working on these jobs under high pressure as any kind of fault might result in scrap and hence in the need to repurchase this expensive material.

In other cases, some materials might have long replenishment cycles. Again, this creates some urgency in terms of not messing up with this material as faulty production processes might cause the need to purchase new material. This in turn would require comparable long waiting times for the new material to arrive and hence could cause unwanted delays in the execution of the overall job.

If you have jobs that in these – or similar – cases depend on crucial material and allow for no faults, why not highlighting them?

BEFORE & AFTER

This is the schedule with the default color schemes. All jobs look equal (with the exception of the color indicating the jobs' status).



After applying a “no fault tolerance” color scheme, the same schedule can look like the below. You see that actually job 8, job 5, and job 14 are highlighted ... so these are the jobs that you (and your people) should treat with some extra care.

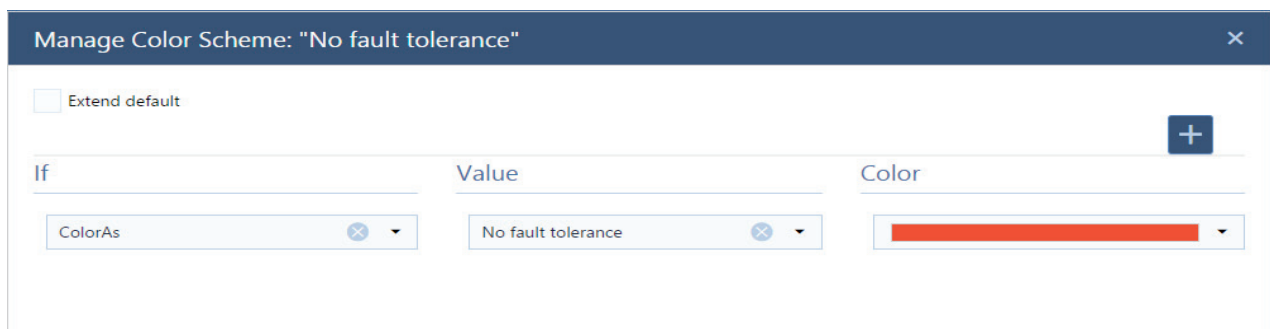
HOW TO BUILD THIS COLOR SCHEME

This color scheme is meant to highlight jobs for which you allow zero tolerance. As this is no default value in just plan it, you first have to define it as so called “color as” value.



Manage "Color As" Values	
<input type="checkbox"/>	Values
<input type="checkbox"/>	No fault tolerance

After that, you can define the respective color scheme “no fault tolerance” by selecting “color as” as filtering property and choose a suitable color. In this case, I selected red to make the crucial jobs really stand out.



Manage Color Scheme: "No fault tolerance"		
<input type="checkbox"/> Extend default		
If	Value	Color
ColorAs	No fault tolerance	Red

RECOMMENDED COLORS

As you need a color to stand out, we recommend either red, as it is very visible when paired with just plan it's default grey, or any of the primary colors.

				
R: 238 G: 60 B: 30	R: 0 G: 255 B: 255	R: 255 G: 0 B: 255	R: 255 G: 255 B: 0	R: 255 G: 255 B: 0

EXECUTION VIEW

WHY THIS COLOR SCHEME IS RELEVANT

As of now, just plan it is for scheduling purposes and has (almost) no functionality that supports the execution. That means we do not support providing feedback from the shop floor directly into the schedule.

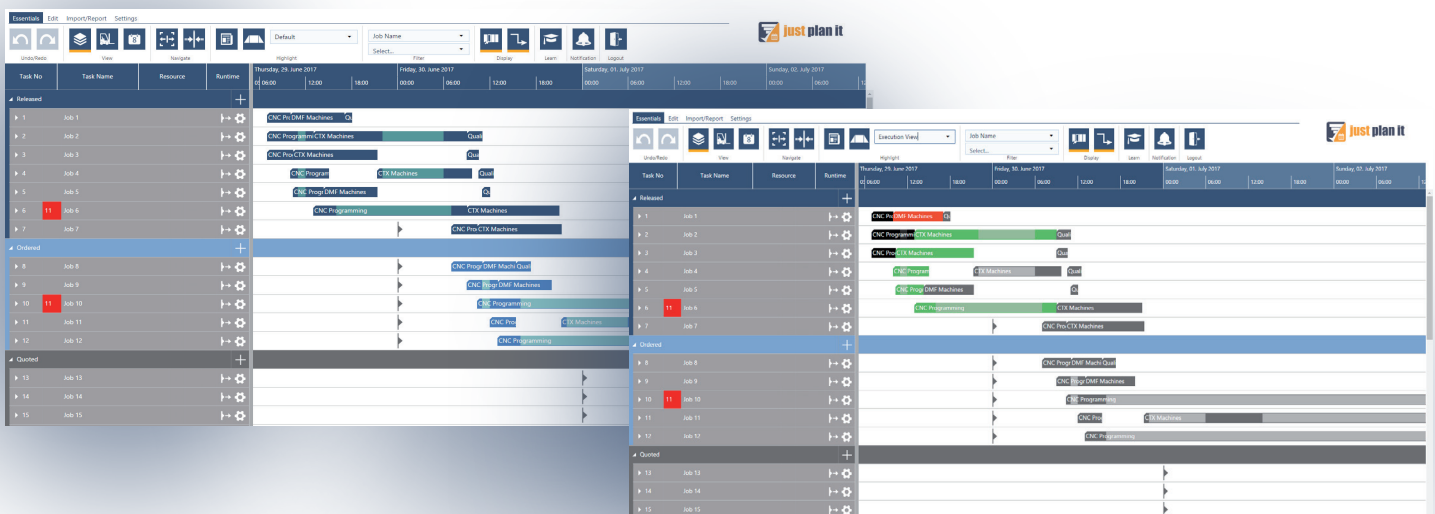
However, we recently signed off the concept of something that we call the “operator app”, which will be either a separate website or de facto an app for a (machine) operator to provide some basic real-time feedback from the shop floor such as task started, task finished, remaining time. These information will be then pushed to the planner who can use them to (automatically) update the schedule accordingly.

We are now in the process of breaking this concept down into development deliverables so that this execution support is supposed to ship during the second half of 2017.

Until then building an Execution View color scheme can be a truly cool alternative.

BEFORE & AFTER

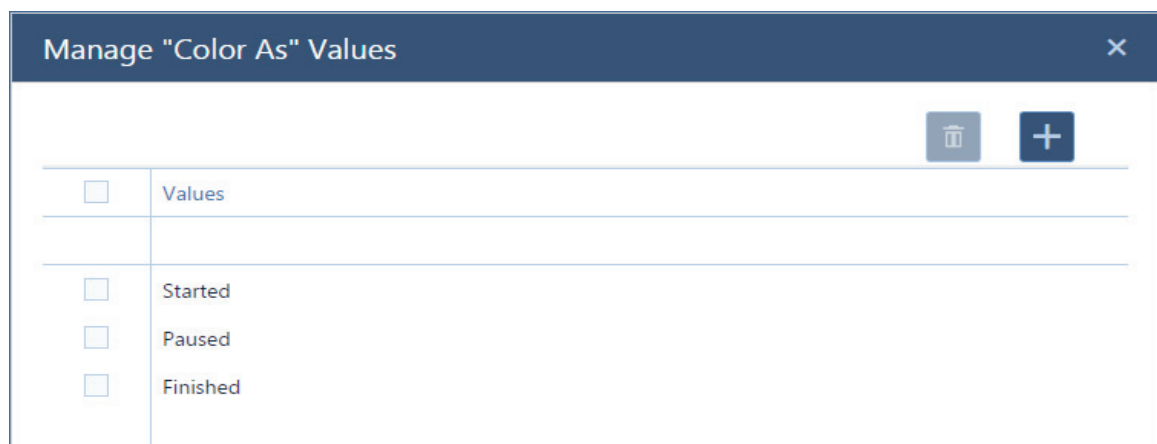
Here is the schedule with the default color schemes. You can see which jobs are released, which jobs are ordered and which are quoted. However, within the released ones, you cannot see which tasks are finished, in process or which have any issue.



After applying an “Execution View” color scheme, the same schedule can look like the below. You see that the first task of job 1, job 2 and job is finished (black). Task 2 of job 1 is on hold (red) and some other tasks are already started (green).

HOW TO BUILD THIS COLOR SCHEME

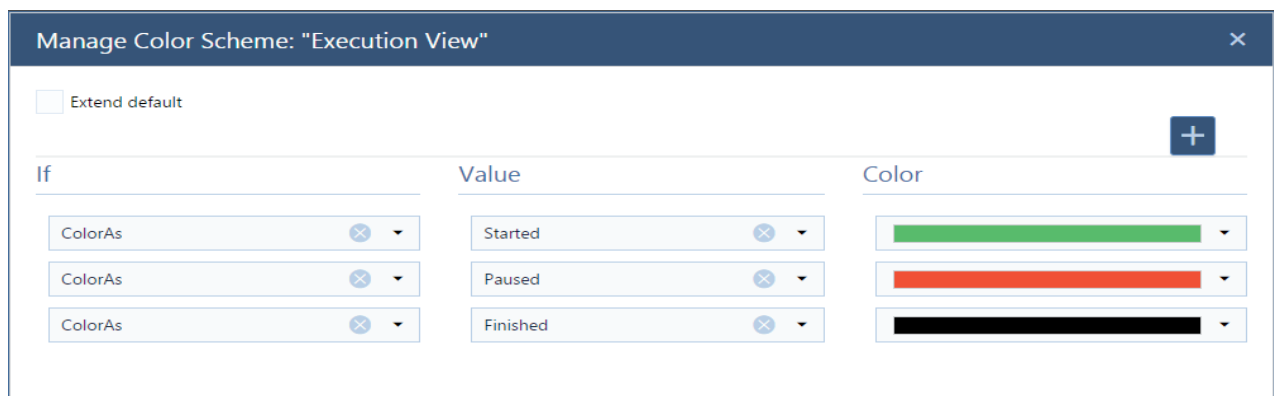
For this color scheme, you can use some of the default “color as” values that we provide with just plan it:



The dialog box is titled "Manage 'Color As' Values" and has a close button (X) in the top right corner. It contains a table with a checkbox in the first column and a text field in the second column. The table has four rows: "Values", "Started", "Paused", and "Finished". To the right of the table are two buttons: a trash can icon and a plus sign (+).

	Values
<input type="checkbox"/>	Values
<input type="checkbox"/>	Started
<input type="checkbox"/>	Paused
<input type="checkbox"/>	Finished

After that, you can define the respective color scheme “Execution View” by selecting “color as” as filtering property and then choose started, paused and finished and define a respective “speaking” color.



The dialog box is titled "Manage Color Scheme: 'Execution View'" and has a close button (X) in the top right corner. It contains a checkbox labeled "Extend default". Below this is a table with three columns: "If", "Value", and "Color". The table has three rows. The first row has "ColorAs" in the "If" column, "Started" in the "Value" column, and a green color bar in the "Color" column. The second row has "ColorAs" in the "If" column, "Paused" in the "Value" column, and a red color bar in the "Color" column. The third row has "ColorAs" in the "If" column, "Finished" in the "Value" column, and a black color bar in the "Color" column. To the right of the table is a plus sign (+) button.

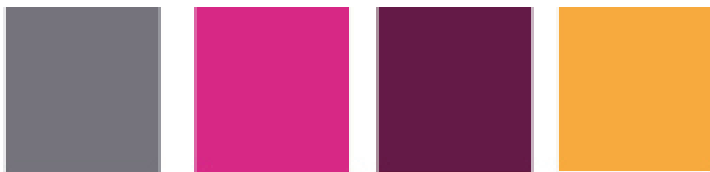
If	Value	Color
ColorAs	Started	Green
ColorAs	Paused	Red
ColorAs	Finished	Black

RECOMMENDED COLORS

We recommend you make use of the complementary colors plus a darker shade. A different option, however, is choosing a dark and a light shade of the same color and a different color for the third shade.



R: 0	R: 238	R: 91
G: 0	G: 60	G: 170
B: 0	B: 30	B: 81



R: 212	R: 127	R: 244
G: 29	G: 0	G: 173
B: 121	B: 69	B: 49



R: 39	R: 72	R: 138
G: 95	G: 125	G: 202
B: 68	B: 217	B: 238

ABOUT COLOR

COLOR CHOICES

There are a few things you must know about color. One might believe the simple act of choosing a color is random, but the truth is that there is more to it. When you choose a color you are driven by an impulse and by your psychological background. It is in the human nature to associate emotions to colors, even if you are not aware of it. This can happen for two reasons:

- 1) **The color culture.** This consists on the color code that we have been learning for generations. For example in the Western world, green is good, red is dangerous or wrong. Red is *don't cross* and *warning, hot water*. (Insert a communist joke). However, in the Eastern world red is perceived as good and positive. (This time, no pun intended). In the Slavic languages, the word "beautiful" comes from the word "red".¹ In the Middle ages, red was for divinities, kings and nobility as it was a very expensive dye and they were the only who could afford it; thus blue was for the common people. Our perception of color changes when placed in different time and culture.
- 2) **Sensitiveness towards color.** We are all born with the same perception of color. The first thing we learn as babies is to assign name to colors and shapes. Then to associate it with emotions. This primary code is lost once we go to school and learn society's conventions for communication. But the traces of that code always remain. For some people, in fact, will just increase and will be able to assign different colors to everything in parallel to knowing the right word. This is called synaesthesia. You are always going to be drawn to those colors which your mind associates with emotions and memories.

While Newton managed to deconstruct color and segmented it into the first color wheel, writer and intellectual Goethe conducted a study in 1810 on how colors were perceived, assigning attributes and personality to every shade based on human reaction.

Now you know that next time you choose a color, it's not by chance.

¹ "Kracibui" (красивый), beautiful, comes from the word "krasni" (красный), red.

²

Color synaesthesia associates different colors to letters, numbers, sounds, flavours and even people. Every synesthetic has his/her own color code based on his/her experience. An example of a synesthetic mind: 2 is yellow, 3 is blue, 5 is red and 6 is green. A simple calculation like 2 + 3 takes a little more time, because yellow + blue will never add red. But it does. Even if in the color code should be green. But it's never 6.

THE COLOR WHEEL

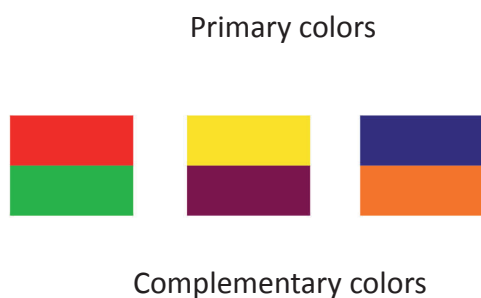
It is also worth mentioning that when you believe you are mostly choosing colors randomly in search of two shades far apart you don't know that most of the time you are choosing complementary colors.

What complementary colors do is balance each other so the eye can perceive them clearly and with all its brightness. Most of the times you are subjected to what your eye and mind subconsciously point you towards. It is in every body to try to balance, it is a natural instinct we have as humans. Nature will always balance. Your eye will try to balance with the color.

Let's start with the primary colors. The primary colors are those who cannot be created by mixing other shades³. They are pure colors. These colors are magenta, yellow and blue cyan. Black and white on the other hand are not colors. White is light and black is the absence of color. They can contribute to create different shades when mixed with colors but they are not colors *per se*. Grey, being created by mixing white and black is also not a color and thus falls out of the color wheel.

So what is the color wheel? The color wheel is a circle with circumscribed circles that deconstruct colors and places them on a scale. It is also a guide to know what colors to mix to create new ones and to learn which color is complementary to which.

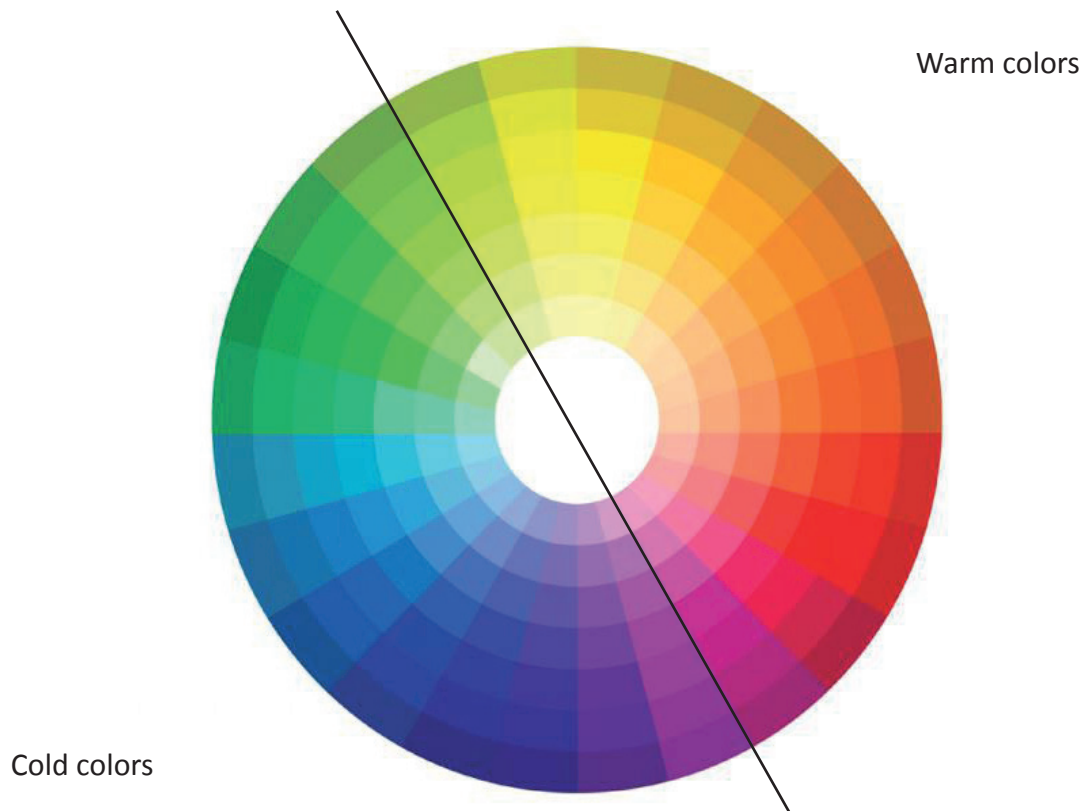
Let's look at the first circle, where we find the primary colors. Their complementary color can be found just in front of them. Its opposite. This works with all the shades placed on the wheel. Using a color and its complementary creates a balance that the eye craves.



The best way to make a color stand out from the rest is by using its complementary

³ When it comes to color software, the RGB values for magenta are R:255, G:255, B:0; for yellow are R:255, G:0, B:255 and for blue R:0, G:255, B:255. This is the purest way of managing such values on a computer as we take into consideration that RGB values for black and white are R:0 G:0 B:0 and R:255 G:255 B:255 respectively, being 0 the lowest value and 255 the highest.

By mixing the primary colors with each other you are able to create an entire palette.



Colors are also separated in warm and cold colors. You probably have noticed that a warm color has a cold color as a complementary and vice-versa. Paring cold and warm shades together is a great way to make them stand out; as two warm shades together might saturate the eye, whilst two cold might unlive the mood. In both cases, non will help each other stand out. They need to be complemented.

With all this in mind you are ready to start making color choices.



TAKE 2 MINUTES GIVE IT A TRY

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