How to correctly choose colors for our application?

Main references:
General course on color theory
http://pedagogie.ac-toulouse.fr/daac/IMG/pdf/5-La_Couleur.pdf
Guide for teachers to adapt to students with a visual dysfunction
https://cache.media.eduscol.education.fr/file/ASH/35/7/guide_eleves_deficients_visuels_116357.pdf
Guide for teachers to adapt to students affected by color-blindness
http://sitecoles.formiris.org/?WebZoneID=590&ArticleID=3950

Global colorimetry has to follow general theory of the colorimetry. We have to create a state of harmony with our colors, and this could me made using these rule: Avoiding primary-only color. We have to use colors consisting in a mix between at least two of primary colors (Any color excepted true blue, true yellow of true red)

Also, in order to create a visual harmony, the sum of colors (given by summing all values RGB for each main colors of our application) must be equal. It creates what color theory calls a “neutral grey”.

To obtain this “neutral grey” the easy way, many designer are creating designs using 2 main contrasting colors according to the contrast circle:

This circle is obtained by arranging the 3 primary colors in an equilateral triangle in the center.

Then, 3 other triangles are obtained by mixing two primary colors at its base.

The 2 firsts steps are a preparation, then the chromatic circle can be draw. Each corner of the hexagonal figure will be extended, giving half of the colors of the circle.

The missing spots are filled by doing a perfect mix between its neighbours.

-> By a matter of fact, each color can be used with the other one, and contrast so created will form a “neutral grey.” (example, Blue violet with yellow orange”). Our application must use 2 colors based on this contrast.

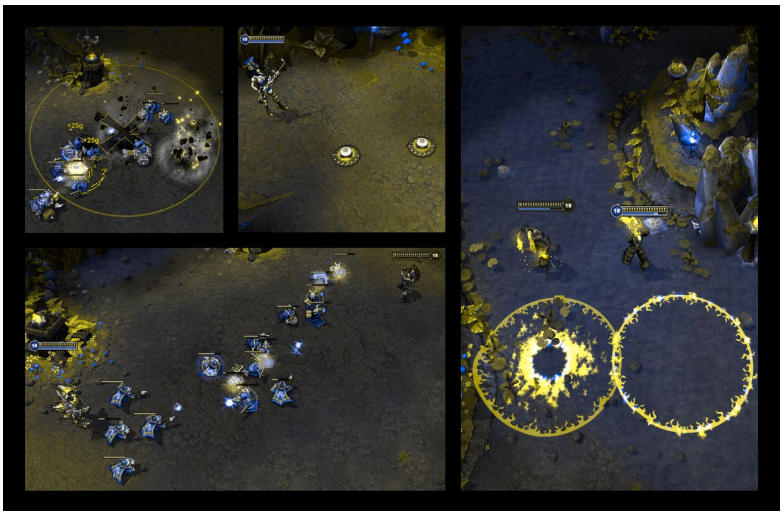
However, a huge portion of the population (depending on countries, 10% for males in the USA and 8 % for males in France, much more frequent among men than among women) have a trouble for seeing colors, also known of colorblindness, and adaptation must be taken for them.

This disease could have different symptoms, and it's impossible to take care of all possible form of it. Some adaptation can still be useful for most common forms.

We could create two spare modes, one for "healthy" people and one for colorblind. However, colorblind mode is usually consisting of more distincts colors, and "healthy" people can tend to prefer this mode as well.

One really nice example of this preference is the colorblind mode of the online game *League of Legends*. At first, the game was not embedding this mode. Then, as stated in this article from 2012:
http://forums.na.leagueoflegends.com/board/showthread.php?t=1701655&highlight=colorblind+mode
the game implemented a color-blind mode for people affected by deuteranopia (red-green confusion, most common form of color-blindness).
Here's some screenshots displaying problems and the solution created by Riot Games:

Game in standard mode



Game as seen by people affected by deuteranopia

Game in color-blind mode

-> This implementation was very successful, and even so, **most of the players are now playing using color-blind mode**, even “healthy” people. This mode is clearer for everyone, and for a game like this where obtaining an information quickly it can be an advantage.

Considering this example, I think **our application can implement only one mode, color-blind friendly**.

How to adapt to color blindness?
-> Avoid using **green and red** combinations
-> Try as much as possible to put symbols on colors when color choosing is important. That way children can rely on two informations rather than just color. In fact, try to make colors a **second way of distinction** rather than a primary one
-> Don’t ask specific questions on color. Don’t penalize when color is incorrect, specially for green and red