# Computer Architectures lab 4.2  
  
### Electronics  
#### OHM's law  
1. To connect a LED on the 5v there is a resistor needed, calculate the minimum resistor value and connect the red LED. \*Note: the LED has a max value of 20mA and a forward voltage of 2V.\*  
> 150 Ω  
2. Calculate this for the blue LED that has a max value of 20mA and a forward voltage of 3,4V.  
> 80 Ω  
3. To connect a LED on the 3.3v there is also a resistor needed, calculate the minimum resistor value and connect the red LED. \*Note: the LED has a max value of 20mA and a forward voltage of 2V.\*  
> 65 Ω   
4. Calculate this for the blue LED that has a max value of 20mA and a forward voltage of 3,4V.  
> 0 (led brand niet !! )  
  
#### Circuits - breadboard  
5. Draw the circuits for Q1 - Q4  
> ( zie bijlage )  
6. What happens if there is a higher resistor between the 5V and the LED?  
> indien te hoog heeft de let niet genoeg om te kunnen branden. of geeft minder licht  
7. Draw the schematic icon of a pushbutton  
> ( zie bijlage )  
8. How does a pushbutton work?  
> ja kan de kring sluiten met de button   
9. Draw the electronic schematic and the breadboard schematic with a pushbutton, the LED and resistor stays the same.  
> ( zie bijlage )  
### Fast charging  
10. Calculate the time it takes to fully charge your phone.  
> Wh=(mAh×3.7V)÷1000 ==> Wh=(3279×3.7)÷1000=12.13Wh ==> 12.13÷0.85=14.27Wh ==> 14.27÷20=0.7135uur ==> 0.7135×60=42.8minuten  
11. With a battery drain of 1W how long does it take before the battery of your phone is empty?  
> Tijd= 12.13 / 1 = 12.13uur  
  
#### And functions  
  
12. Draw the following circuit (electronic and breadboard), when 2 push buttons return true the LED will turn on.  
> (zie bijlage )  
13. Explain the working of this circuit  
> A EN B moeten gesloten zijn om de lamp te laten branden.  
14. Draw the truth table for this circuit  
  
> A false B false = false   
---  
> A false B true = false   
---  
> A true B false = false  
---  
> A true B true = true  
  
15. Calculate the needed resistor  
> 150 Ω  
  
16. Add a 3th button and second led. Both LED's are on when all push buttons return true. Recalculate the needed resistor.  
> 75 Ω  
  
#### OR functions  
  
17. Draw the following circuit (electronic and breadboard), when 1 of the 2 push buttons return true the LED will turn on.  
> (zie bijlage )  
18. Explain the working of this circuit  
> A OF B moeten gesloten zijn om de lamp te laten branden.  
19. Draw the truth table for this circuit  
> A false B false = false  
---  
> A false B true = true  
---  
> A true B false = true  
---  
> A true B true = true  
  
20. Calculate the needed resistor  
> 150 Ω  
  
#### Circuits  
  
21. Create a parallel circuit with 4 LED's. There are 2 ways to do this, with in each node a resistor or with 1 resistor in series with the parallel circuit. Draw for both possibilities the electrical and breadboard circuit.  
> (zie bijlage )  
22. Calculate the resistor values (for 4 resistors and for 1 resistor in series)  
> 150 Ω of ( 4 x 37.5 Ω )  
  
23. Create a circuit with 2 AND functions and 1 OR function, where the last AND get's the input of the OR function and the first AND function. In this circuit add 3 LED's.  
Draw the schematics with the logic gates, electronic and breadboard.  
> (zie bijlage )  
  
24. What possible combinations of button presses will the LEDs light up? Calculate this using DNV. This can be done via the truth tables or faster using the logic laws.  
> A false B false C false = false  
---  
> A false B false C true = false  
---  
> A false B true C false = false  
---  
> A false B true C true = true  
---  
> A true B false C false = false  
---  
> A true B false C true = true  
---  
> A true B true C false = false  
---  
> A true B true C true = true  
---  
  
#### Shift register  
25. Draw a circuit with the shift resistor and 8 LED's  
> (zie bijlage )  
  
26. What binary value has to be send to the shift resistor to turn LED 2, 4, 5 and 8 on?  
> 0 1 0 1 1 0 0 1

Afbeelding met tekst, handschrift, whiteboard, schets

Door AI gegenereerde inhoud is mogelijk onjuist.

Afbeelding met tekst, handschrift, Papierprodcut

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Afbeelding met tekst, handschrift, Papierprodcut, papier

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