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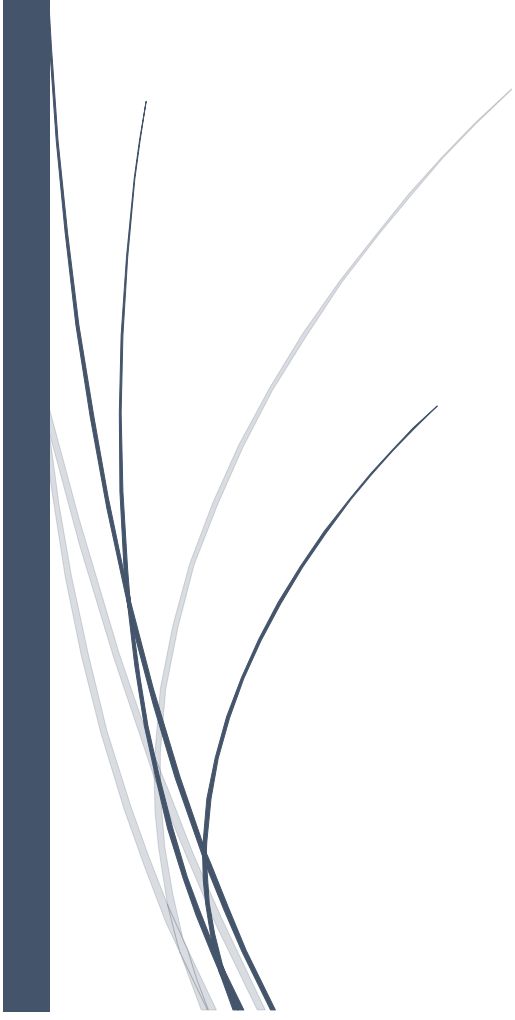
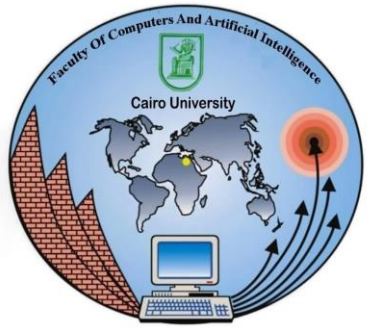
An Expert System for Antibiotics in Neonates





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This knowledge was taken from:

El-Galaa Teaching Hospital

Department of Clinical Pharmacy

The Expert of the domain is:

Dalia Abu Al-Maaref (Clinical pharmacist)

The knowledge we used is in an excel sheet that is called "Antibiotics Dosage knowledge"

How our expert system works

Our expert system can calculate the exact dosage the baby needs.

How the system calculates the final dose:

- Firstly, you will choose the medicament name you want to use
- Every medicament has certain facts like (analysis method, solution type, final concentration, method of administration)
    - Facts like analysis method, solution type and method of administration are not that important for the system we just print them if the Pharmacist needs them, but they aren't used to calculate the final dosage
    - But the fact we need is the final concentration to calculate the final dose
- Secondly you will choose the postnatal age between:
    - 1:7 days
    - 8:28 days
        - (For some medicaments [very few] you don't need the postnatal age, so the system won't ask to enter it for these medicaments)
- (Optional) for some medicaments the system will ask if the baby have side effects like:
    - Does the baby have meningitis
    - Or does the baby have thrush
- Next you will enter the uterine age (for some medicaments you don't need the uterine age, so the system won't ask to enter it for these medicaments)
- After that you will enter the baby weight
- (Optional) for some medicaments the system will ask you to enter the dose allowed according to postnatal age in days
- (Optional) for some medicaments the system will ask you to choose the uterine age according to preterm or term if it is asked then the system won't ask you to enter the uterine age above

- The system now can get the dose needed based on these inputs you entered.
- The system then can calculate the final dose by using this equation: (dose * baby weight) / final concentration

An example of how the system works

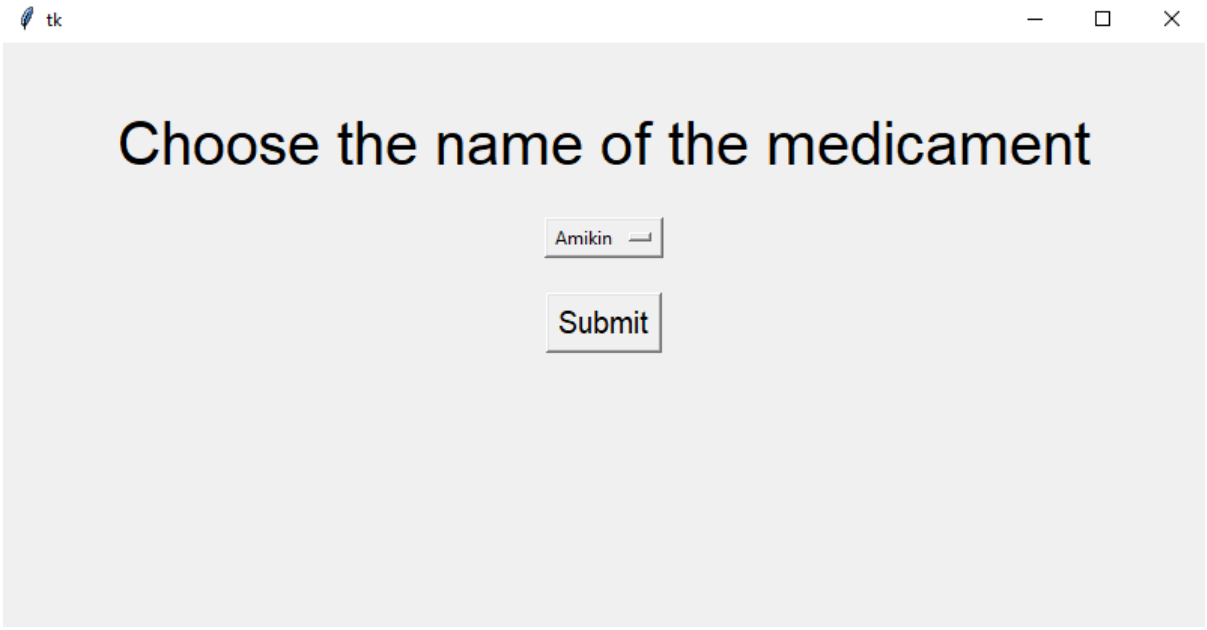
- Let’s say we choose the first medicament Amikin.
- The system first will get the facts for Amikin (analysis method, solution type, final concentration, and method of administration)
- But from the knowledge we can notice that there are 2 facts for analysis method so the system can’t choose which fact to choose yet
- We now have the final concentration (fact) = 5 mg/ml
- The system now will ask you to choose postnatal age between 1:7 days or 8:28 days let’s say we will choose 1:7 days
- The system now will ask if the baby have meningitis or not, we will choose no
- Now the system will choose the first fact of analysis method (1 cm extend to 50 cm)
- Now from the knowledge we have 3 conditions for uterine age:
    - <= 30 weeks
    - 30 – 36 weeks (<10 days)
    - >35 weeks (>= 10 days)
- The system will ask you to enter the uterine age let’s say we entered 36, we will have a problem in our condition because the system now will go in condition 2 (30 – 36 weeks) and condition 3 (>35 weeks) so we need another condition to choose which condition should the system go in

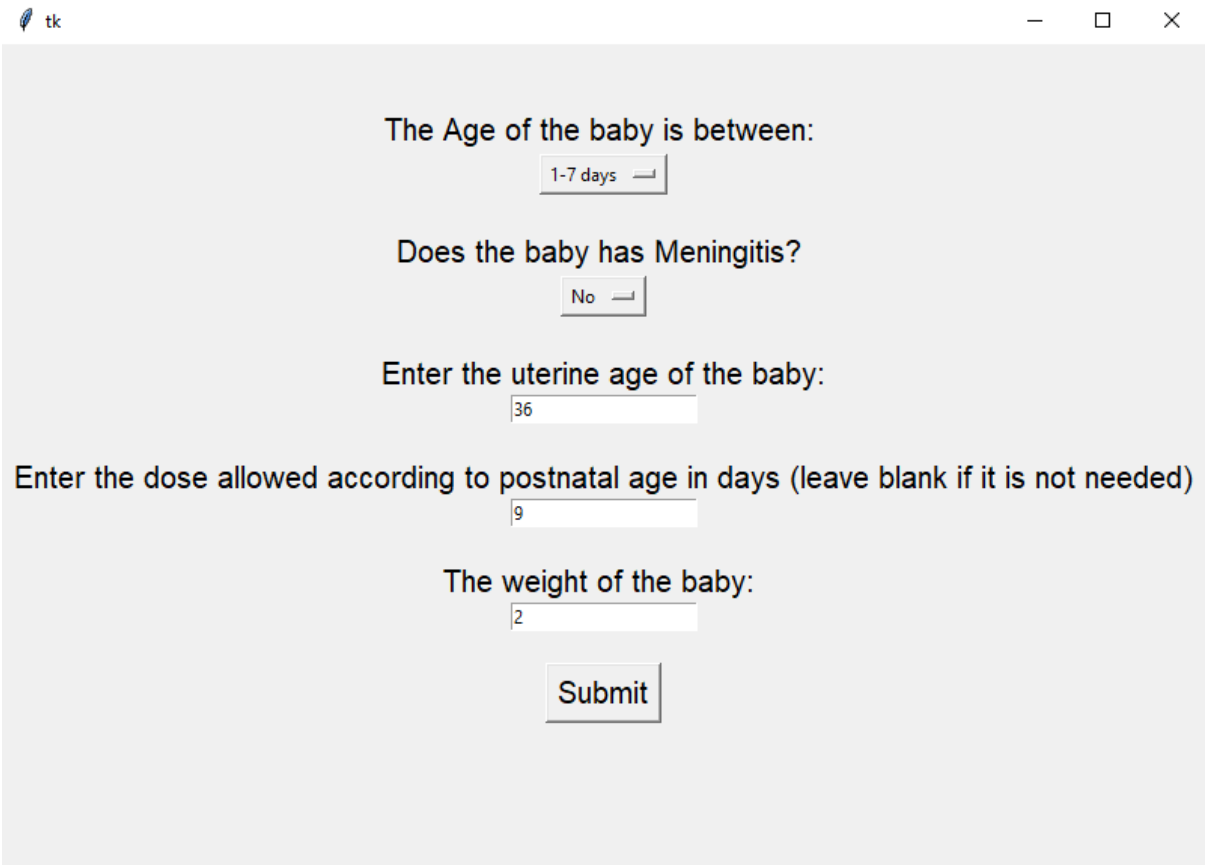
- The system will ask you to enter the dose according to postnatal age in days which represents the highlighted number in red in the figure below

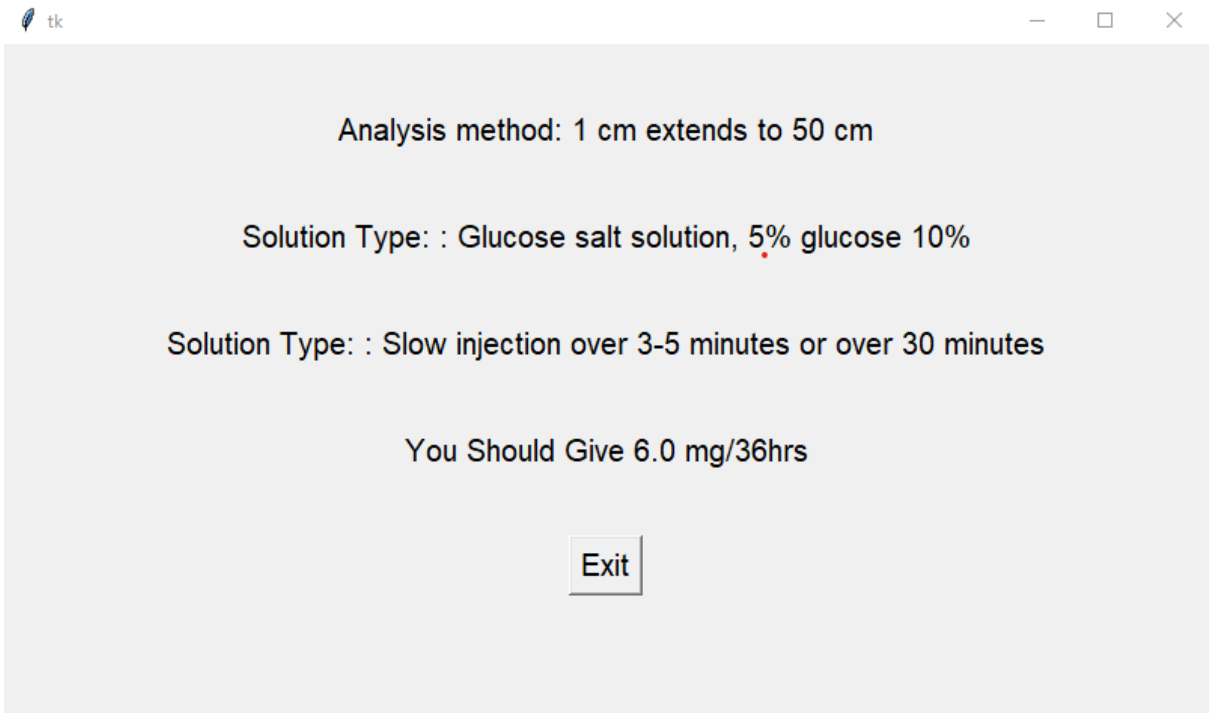
medicament name	analysis method	solution type	Final concentration	method of administration	dose	
					1:7 days (postnatal age)	8:28 days (postnatal age)
Amikin	1 cm extends to 50 cm	Glucose salt solution, 5% glucose 10%	5 mg/ml	Slow injection over 3-5 minutes or over 30 minutes	≤30week:15mg/kg/48hrs (30-36) weeks(<10 days):15mg/kg/36 hrs >35 weeks(>=10 days): 15mg/kg/24hrs	≤30week:15mg/kg/24hrs (30-35) weeks:18.5mg/kg/24hrs >35 week:17mg/kg/24hrs
	1 cm is completed by 10 cm				Meningitis: ≥2kg:7.5 mg/kg/12hr	Meningitis: ≥2kg: 10mg/kg/8hr

- So, let's say we entered 9 which is < 10 days so the system will go in the second condition and the dose will be 15 mg/kg/36 hrs.
- Lastly the system will ask to enter the baby weight let's says we entered 2
- Now the system will calculate the final dose from the equation: (dose * baby weight) / final concentration = (15 * 2) / 5 = 6 mg/36 hrs.
- The system will also print these facts (analysis method, solution type and method of administration) which are not important but if the pharmacist needed them

Screenshots of the running system



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Analysis method: 1 cm extends to 50 cm
Solution Type: : Glucose salt solution, 5% glucose 10%
Solution Type: : Slow injection over 3-5 minutes or over 30 minutes
You Should Give 6.0 mg/36hrs
Exit