

Homework 10

Due: 15 April 2025

Problem 10.1 — practical

Write the following functions in Haskell.

- Write a function `quadratic` that computes one of the roots of the quadratic equation represented by given `a`, `b`, and `c` values. (Using the quadratic formula. I don't care which of the two roots you return.)
- Write a function `middleCharacter` that finds the middle character of a given odd-length string.

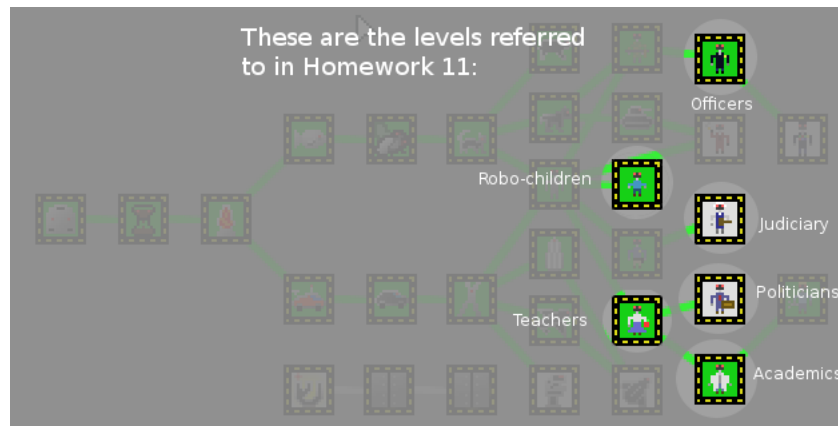
Include (in comments) examples of expressions you used to test the function, and what that expression should return.

Problem 10.2 — theoretical

Continue working on levels of *Manufactoria*. Pick two of the following levels and, once you've figured out how to do them in the game, draw out the transition diagram for the control of a Turing machine that solves the same problem.

- Robo-children
- Teachers
- Officers
- Judiciary
- Politicians
- Academics

Remember that a Turing machine, unlike a *Manufactoria* machine, moves left and right on an infinite tape and has a blank symbol—in particular, make sure that you somehow distinguish between blanks and blue dots.



Hand in the files containing the Haskell code using the handin script:

```
handin cmsc208 hwk10 myfile.hs
```

If you want to put the Turing machine diagrams in electronic form too I'll accept them that way, but I think they'll be mostly easier to do on paper. (Please write neatly!)

Collaboration policy: **For Problem 10.1:** collaborative. You each have to hand in your own version of the assignment, but you can talk to other people about the problems. Mention in a comment or readme who you worked with. (Still no copying, though.) **For Problems 10.2:** group work! If you work with other people on this homework, you can just hand in one copy and put all your names on top. There will be a revision cycle for this.