Problem 1a

- It is fine for a solution to be more complicated if the reason is that it allows s to be in xs multiple times although the problem does not require handling this situation.
- It is fine to use the = operator directly instead of same_string even though the specification asked for same_string.
- A helper function is really not needed here, but many people will probably use one. Generally consider a good such solution to be worth a 4, but a 5 is okay if it is really nice.

Remember that you are grading on general style, not how close to the sample solution a student solution is. It is perfectly fine for a solution to be significantly different from the sample, as long as it has good style.

Problem 1b

Here is a sample solution:

- Give at most a 3 if they use helper functions other than all_except_option and ML's append operator @. This includes functions defined in get_substitutions1 as they are not helpful here.
- If a solution uses a local val binding for no useful purpose, still give a 5 if everything else is great, but this really is inferior style. For example:

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Problem 1c

Here is a sample solution:

In addition to general style, the most important thing we are checking is that there is a tail recursive local helper function.

- Give at most a 2 if they do not define a helper function.
- Give at most a 3 if their helper function is not defined locally (inside get_substitutions2).
- Give at most a 3 if the helper function is not tail-recursive: where it calls itself (only one place is needed), there should be no more work afterward. So the result of the recursive call should not be an argument to anything like another function, @, etc.
- Give at most a 3 if you cannot easily find the initial call to the helper function with [] for an accumulator argument.

The sample solution uses a case-expression directly for the accumulator argument to the recursive call loop. This is not necessary for good style. A fine alternative is something like:

It is also okay if a solution uses local variables in good style for computing the values that are then passed to the recursive call.

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Problem 1d

Here is a sample solution:

- It is fine, in fact even slightly better, to have the record pattern in the function argument, something like fun similar_names(substitutions,{first=f,middle=m,last=l})=
- Give at most a 4 if they do not use one of the get_substitutions functions defined earlier.
- Give at most a 3 for a solution longer than 25 lines, not including comments. (Exact line count is never important, but this is over 2.5 times as long as the sample solution.)

Remember that you are grading on general style, not how close to the sample solution a student solution is. It is perfectly fine for a solution to be significantly different from the sample, as long as it has good style.

Problem 2a

Here is a sample solution:

- Do not penalize solutions that do not use the wildcard pattern (something like (Clubs,x) for each pattern).
- Do not penalize solutions that take an argument that is a pair pattern (something like funcard_color(suit,value) =).
- Do not penalize solutions that use function-pattern syntax, something like:
- Give a 4 for this solution, which does not use nested patterns:

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Problem 2b

Here is a sample solution:

Follow similar guidelines as for the previous problem.

Problem 2c

Here are two sample solutions:

- There are unlikely to be too many ways to make solutions much more complicated without introducing poor style.
- Do not penalize solutions that define their own function to see if two cards are equal rather than using the = operator.

Remember that you are grading them on general style, not how close to the sample solution their solution is. It is perfectly fine for their solution to be significantly different from the sample, as long as it has good style.

Problem 2d

Here are two sample solutions:

- Give at most a 4 for not having a single case expression with a nested pattern like head::neck::tail (though they can use other variable names). But if you see a more complicated pattern like do not penalize it. (It technically uses a feature we did not see, but it is arguably better than the sample solution.)
- Do not penalize solutions that use longer patterns for the one-element list than [_]. So all of these are also fine:

[x]_::[]x::[]_::nilx::nil

Remember that you are grading on general style, not how close to the sample solution a student solution is. It is perfectly fine for a solution to be significantly different from the sample, as long as it has good style.

Problem 2e

Here is a sample solution:

As with problem 1c, our focus is on making sure there is a tail-recursive locally defined helper function:

- Give at most a 2 if they do not define a helper function.
- Give at most a 3 if their helper function is not defined locally (inside sum_cards).
- Give at most a 3 if the helper function is not tail-recursive: where it calls itself (only one place is needed), there should be no more work afterward. So the result of the recursive call should not be an argument to anything like another function, +, etc.
- Give at most a 3 if you cannot easily find the initial call to the helper function with 0 for an accumulator argument.

Other things:

- Give at most a 4 if the solution does not use card_value as a helper function.

Remember that you are grading on general style, not how close to the sample solution a student solution is. It is perfectly fine for a solution to be significantly different from the sample, as long as it has good style.

Problem 2f

Here is a sample solution:

This problem has an especially large number of reasonable solutions that would be good style. So use your best judgment. Do not necessarily penalize solutions that use conditional expressions less cleverly than the sample solution. However, give at most a 4 if sum_cards can be called more than once when the body of score is evaluated.

Problem 2g

Here is a sample solution:

For a longer function like this, we cannot expect solutions to look much like the sample solution, so let's list some things to look for:

- A local helper function keeps track of remaining cards, moves, and held cards in some way
- Use of previously defined functions: remove_card, sum_cards, score
- Good use of case-expressions and pattern-matching. Do not require the nested patterns in the outer case expression above where we have different patterns for the head of the list -- a nested case expression is okay instead.
- A moderately longer solution is okay, but a solution twice as long (in terms of amount of code -- do not worry about how much is put on each line) is probably doing something unnecessary.

Use the general scoring guidelines: 5 for a great solution, 4 for one with a small number of issues, etc.

Problems 3a and 3b

You do not need to provide feedback on problems 3a and 3b (the challenge problems), but you are welcome to give text feedback on these problems here if you wish.