
HW 5 – Algebraic Datatypes

CS 421 – Fall 2014

Revision 1.0

Assigned September 25, 2014

Due October 2, 2014, 23:59 pm

Extension 48 hours (20% penalty)

1 Change Log

1.0 Initial Release.

Homework 5 requires you to write OCaml code, so before submitting please make sure that your solution successfully compiles. You should put code answering each of the problems below in a file called `hw5.ml`

The command to commit this file is:

```
svn commit -m "Turning hw5." hw5.ml
```

2 Objectives and Background

The purpose of this HW is to test your understanding of the algebraic datatype system in OCaml.

3 Problems

1. Define 52-card Anglo-American deck used for such games as poker and contract bridge. It contains one card for each unique combination of thirteen ranks and the four suits spades, hearts, diamonds, and clubs. The ranks (from highest to lowest in bridge and poker) are ace, king, queen, jack, and the numbers from ten down to two.
 - 1.1. (10 pts) Define `card` data-type consisting of ranks and suits. Both suits and rank have to be precise, there should be exactly four suits and exactly thirteen ranks represented by your data-type, thus there must be exactly fifty-two unique combinations of suits and ranks.
 - 1.2. (2 pts) Define `color` data-type consisting of red and black.
2. (7 pts) Write a function `card_rank` that returns the integer value representing a card's rank. Specifically, the rank of two is (integer) 2, ..., the rank of ten is 10, the rank of jack is 11, queen 12, king 13, and ace 14.
3. (5 pts) Write a function `color_of_card` that determines color of a given card. (Note: diamonds and hearts are red, clubs and spades are black).