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ICS-361-001 [MAN.78127.FA15]: Assignments

Assignment - In progress

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Title	Assignment 4
Due	Nov 12, 2015 11:55 pm
Status	Not Started
Grade Scale	Points (max 90.0)
Modified by instructor	Oct 29, 2015 8:19 pm

Instructions

Rules: Cite any sources you use, and write your own comments and error messages. Do not use any built-in predicates (aside from arithmetic operators and format/2).

Bonus points: Earn up to a total of 20 bonus points by making your code print out informative errors (e.g. “LISTLENGTH/2: The first argument must be a list.”). I recommend that you try to answer all the questions first, then add in error checking.

1. (15 points) Create a recursive Prolog predicate **listlength/2** that has a list as its first argument, and the length of that list as its second argument.

Examples:

```
?- listlength([9, 5, 6, 4],L).

L = 4.

?- listlength([], 0).

true.

?- listlength(List, 0).

List = [].

?- listlength([5, [6, 7, 8]], L).

L = 2.
```

Make a transcript of your predicate working on five representative cases.

What happens if you do this, and why?

```
?- listlength(L, 3).
```

Hint: This might be useful for Question 2.

2. (50 points) Write predicates that will find solutions for each of the following colored-balls-in-a-row problems with different sets of constraints.

Situation #1 (10 points)

- You have six colored balls: 2 green, 2 blue and 2 yellow
- No balls of the same color may be adjacent to one another.

Situation #2 (10 points)

- You have six colored balls: 4 black, 1 red and 1 blue.
- There are no more than 2 black balls in a row.

Situation #3 (30 points)

- You have eight colored balls: 1 black, 2 white, 2 red and 3 green.