CS 352 QUIZ 3 (50 points) Name

Note: open book test. Please upload all programs with outputs added as comments to blackboard along the Assignments->Quiz3 link. You have 45 minutes to work on it; 5pts off if submitted on or before 60 minutes cutoff line. No credit after 60 minutes.

1. (15 pts) Assume you tip a restaurant as follows:

|  |  |  |
| --- | --- | --- |
| Bill | Tip | Total Cost |
| <=$0 | $0 | $0 |
| ($0, $20] | 10% of the bill | bill+tip |
| >=$20 | 15% of the bill | bill +tip |

Write a Prolog program to calculate the tip and total. For the queries below, your program should respond similar to the following:

?-bill(0,TP,TC).

TP = 0, TC=0

?-bill(10, TP, TC).

TP = 1, TC = 11

?-bill(30,TP,TC).

TP = 4.5, TC=34.5

1. (20 points) A Prolog database contains clauses of the form:

**male(X) /\*X is male\*/**

**female(X) /\*X is female\*/**

**parent(X,Y) /\*X is a parent of Y\*/**

**diff(X,Y) /\*X and Y are different\*/**

(1) Write prolog clauses (i.e. rules) to define the following relationship.

a. is\_father(X) /\*X is a father\*/

b. aunt(X,Y) /\*X is an aunt of Y\*/

c. is\_grandparent(X) /\*X is a grandparent\*/

(2) Given the following facts,

male(john).

male(sam).

female(mary).

female(alice).

female(jody).

parent(john, alice).

parent(john,jody).

parent(sam,mary).

Parent(alice, mary).

What will be the response of prolog for the following questions (note: show all possible answers.)

?-is\_father(X).

?-is\_aunt(X,mary).

?-is\_grandfather(X).

3. (15 pts) Write a prolog program to calculate or verify each element of a second list is the square of each corresponding element of the first list, for example,

?- square([1, 2, 3, 4], [1, 4, 9, 16]).

true

?- square([1, 2, 3, 4],R).

R = [1, 4, 9, 16]

?- square([],R).

R = []