This is a take-home midterm. It is to represent your individual work. You are not allowed to communicate with anyone else (other than the current 3342 prof) about the questions/answers on it. This includes but is not limited to not being allowed to post questions about the midterm material to the web during this period. Due to various issues, this communication ban extends to Wednesday 2 March 2016, 5pm.

Although you are not allowed to discuss the midterm questions/answers with anyone (other than the current 3342 prof), you are allowed to look up material that existed prior to the handing out of the midterm (as well as whatever material I put up on the Course Announcements page (or link to said page)) to aid in formulating your answer. Where material is quoted directly or plays a significant role in the formulation of your answer, it is expected that you will include a reference to the work involved (a URL in the case of web pages and a regular bibliographic citation in the case of non-web material).

To be handed back on time, your exam must be in the course locker by noon on Tuesday 1 March 2016. I expect to be at the locker at that time and to clear it before heading to class. If you hand the midterm to me up to the end of class, it is late, incurring a 10% lateness penalty. After that, it will not be accepted.

You are strongly encouraged to hand in a rough draft solution to the Midterm days early. Then review it and hand in a more polished solution later (but still on time). The paper with the latest DATE AND TIME HANDED IN will be the one that is marked. Each handin should be a handin of the entire midterm (and so repeat answers that you are not changing as well as those you are changing). You should record a copy of your midterm before handing it in so that if you want to hand in a revised midterm, you will be able to easily copy the parts you don't want to change.

Note that we have spent a bit of class time on how to give a good answer to a why question (as well as featuring this on two practice quizzes and various links on the course announcement page). You are expected to have mastered this material and to be able to incorporate it into your answers to the questions on this exam.

Emailed copies of the midterm will not be accepted; the handin must be either in the locker or directly to me.

I expect most people to write directly on the midterm as they would a regular exam, but if you decide to edit the pdf directly and then print out the result, be sure not to change the basic layout of one question per page, nor the font or location used for the question or other non-white space parts of the original document.

As noted in the course outline: [W8] Monday 29 Feb 2016: no further questions on the takehome midterm after 3pm today -- expect to have last posting the course announcements page caused by such questions made by 5pm today.

Note, this means if you have a question about the midterm, you can ask it by email (or directly to me) up till 3pm Monday. After that, you will just have to do the best you can and be judged accordingly.

Note, you should definitely check the course web page after 5pm Monday to see if anything posted impacts the answers that you have handed in (remember, you are allowed to hand in multiple versions of your midterm answers, but only the most recent will be marked (if the same date is on more than one handin that is most recent, a random choice will be made as to which to mark)).

Note that on each page I ask for your UWO email address. Print neatly as this will be key in reconstructing your answers if your pages get separated.

A printed copy of this exam was handed out Thursday 25 Feb 2016 in class (10:30 to 11:30am). A pdf copy of the exam was posted later that day.

The midterm consists of this cover page and 6 questions, one question per side of a page (or if you can't do double sided printing, one question per page).
Question 1: We have looked at two programming languages so far, Ruby and Prolog. Which of them do you feel has greater redundancy? Why?
Question 2: What would be an example of how the notion of 'locality of effects' in language design plays out in the Prolog language? Why?
Question 3: The textbook says "Using one uniform end-scope indicator has the severe disadvantage that a nesting error may not be identified as a syntactic error." Using Ruby as your example language, show (with actual example working code) how this problem might arise and explain what was intended and what could actually happen.
Question 4: The official Java grammar can be found at https://docs.oracle.com/javase/specs/jls/se7/html/jls-18.html. A simple Java program that successfully compiles is the one liner:

```java
class Y { public static void main(String[] args) { System.out.println("hi"); }}
```

Show how this Java program would be parsed from the official Java grammar, using the notation of Exhibit 4.5 in the textbook. Note, the layout of such diagrams can be tricky, so you will probably want to sketch it out on scratch paper before putting it on the exam form. It should fit on this page easily, but if it doesn't, see announcement's page for how to make best use of the blank side at end of exam for a two page diagram.
Question 5: In both C and Java, we have int as a primitive hardware type. In Ruby we have the type integer, which is a bit different from a primitive hardware type. What is the most significant aspect of this difference for an application programmer? Why?
Question 6: What is the most important difference between Prolog and a resolution theorem prover? Why?
The road to wisdom? -- Well, it's plain and simple to express:
   Err
   and err
   and err again
   but less
   and less
   and less.

Piet Hein (1905 -- 1996)
https://en.wikiquote.org/wiki/Piet_Hein