Quiz 3

EECS665 - Compiler Construction
2019, Fall

Name: _____ Student ID: _____

Do Not Open Until Instructed!

Before the Quiz starts:

- Read all of the instructions on this page
- Write your name and student ID on this page
- Retrieve your page of notes and writing materials
- Put all other materials away and silence your devices

After the Quiz starts:

- Write your student ID (**not** your name) on all subsequent pages
- If you feel a question is wrong or impossible, notify course staff.
- Announcements / corrections will appear on the projector
- Turn in all your related paper when finished, including:
  - your notes page
  - the provided quiz itself
  - provided reference pages
  - provided scratch paper
- You may leave when done (no new material will be presented).
- Work quickly, move on if you are stuck.

Feel free to draw something **not spooky** in the box below to pass the time

Total Questions: 5
Time Limit: 35 minutes
Total Pages:

- 6 pages total

Score: _____ / 50 pts

Student ID: _____

Question 1 (10 Points)

Translate the following program into 3AC

```
int callee(int arg){
        while (arg > 3){
                arg = arg - 1 * 2;
                if (arg == 2){
                        return 7;
                }
        }
        return arg * 2;
}

int main(){
        callee(1);
}
```

Question 2 (15 Points)

Student ID: _____

Draw a negatron AST that might represent the following 3AC code (you should stick as close to the AST nodes given, but it's ok to approximate):

```
        enter proc
        getin 1, [a]
        getin 2, [b]
        [tmp1] := [a] > 6
        iffalse [tmp1] goto lbl1
        setout 1, [b]
        goto lbl2
lbl1:   nop
        [tmp2] =  [a] + [7]
        setout 1, [tmp2]
lbl2:   leave
```

Question 3 (10 Points)

Student ID: _____

Give an example of a language and its runtime environment.

Question 4 (10 Points)

Student ID: _____

Assume a version of Negatron called NegatronImpl in which types are computed implicitly. That is, declarations do not explicitly indicate types and instead use the keyword "var". For example, instead of a declaring a local variable like "int age", the declaration would simply say "var age". Note that the designer of NegatronImpl could choose to use static typing or dynamic typing.

Give a NegatronImpl program that would run to completion without errors if dynamic typing was used, but would not pass type checking if static typing was used. You may assume a type checker that does not take into account the values of global variables in computing viable paths. newpage

Question 5 (10 Points)

Student ID: _____

It should be clear that C does NOT use a static allocation scheme. Present an example of a C program that would behave differently if static allocation was used. Indicate what the results would be under a static allocation scheme and the actual C allocation scheme.
Note: you don't have to draw out memory, just set up a program that has a different exit code or prints different output under the two schemes.