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Homework 3
COMP 3220
Due: September 14th, Sunday by 11:59PM (midnight)
Please submit as a PDF or WORD document using Canvas

(1. 10pts) Question 5.4 (page 236) from the textbook.
Ans: Implicit heap-dynamic variables are bound to heap storage only when they are assigned values. They acquire types only when assigned values, which must be at runtime. Therefore, these variables are always dynamically bound to types.

(2. 20pts) Question 5.6 (page 236) from the textbook.
Ans:
   a)
      I.   Sub1
      II.   Sub1
      III.   Main
   b)
      I.   Sub1
      II.   Sub1
      III.   Sub1

(3. 20pts) Question 5.9 (page 238) from the textbook.

Ans:

Variable	Where Declared

In sub1:

Variable	Where Declared
a	sub1
y	sub1
z	sub1
x	main

In sub2:

Variable	Where Declared
a	sub2
x	sub2
w	sub2
y	main
z	main

In sub3:

Variable	Where Declared
a	sub3
b	sub3
z	sub3
w	sub2
x	sub2
y	main

(4. 20pts) Question 5.10 (page 238) from the textbook.

Ans:

*Note: Do not get confused between "Points" and "Definitions."

	Variable	Definition
Point 1:	a	1
	b	2
	c	2
	d	2
Point 2:	a	1
	b	2
	c	3
	d	3
	e	3
Point 3:	a	1
	b	2
	c	2
	d	2
Point 4:	a	1
	b	1
	c	1

(5. 20pts) Question 5.12 (page 240) from the textbook.

Ans:

*Note: Everything under variable corresponds to the letter's (e.g. a, b, c, etc) answer to the number of visible variables.

*Note: Also, the Where Declared is not in order of execution simply because it was not specified to do so in the problem's directions. I thought this way would be more organized, but to each his own.

	Visible Variables	Where Declared
a.		Main
	y	Sub1
	b, z	Sub2
	a, x, w	Sub3
b.		Main
	y, z	Sub1
		Sub2
	a, x, w	Sub3
c.		Main
	a, y, z	Sub1
	b	Sub2
	x, w	Sub3
d.		Main
	a, y, z	Sub1
		Sub2
	x, w	Sub3
e.		Main
	y	Sub1
	a, b, z	Sub2
	x, w	Sub3
f.		Main
	a, y, z	Sub1
	b	Sub2
	x, w	Sub3

(6. 10pts) Some programming languages are type-less. What are the obvious advantages and disadvantages of having no types in a language?

Ans:

The advantage of a type-less language is flexibility; any variable can be used for any type values. This is a disadvantage as there is poor reliability due to the ease with which type errors can be made, coupled with the impossibility of type checking detecting them. The absence of types can create ambiguity as to the contents of a variable.