

CVP PRACTICE CLASS 2

Chapter 3: Review Questions

1. What is the difference between synthesized and inherited attributes?
2. Explain the meaning and purpose of
 - a. Operational semantics
 - b. Denotational semantics
 - c. Axiomatic semantics
3. What does partial correctness means for a loop construct?

Chapter 3: Problem Set

1. Compute the weakest pre-condition for each of the following program fragments and its given post-condition:
 - a. $a = 4 * b - 8 \{a > 0\}$
 - b. $\text{if } (x > y) \text{ } y = 4 * x + 1 \text{ else } y = 4 * x - 5; \{y > 3\}$
2. Consider the following program fragment and its given post-condition. The function $\text{sqrt}(y)$ returns the square root of y and comma (",") in the post-condition represents logical conjunction. Show the derivation of the concrete values for the variables a and b in the pre-condition of this program fragment that will make it correct.

```
a = 1;
y = b * b - 4 * a * c;
if (y >= 0) {
    z = sqrt(y);
    x1 = (b + z) / (-2 * a);
    x2 = (b - z) / (-2 * a)
}
{x1 = -7, x2 = 3}
```

3. Write an attribute grammar whose BNF basis is as follows:

```
<assign> -> <var> = <expr>
<expr> -> <var> + <var> | <var>
<var> -> A|B|C
```

and whose language rules are as follows:

Data types cannot be mixed in expressions, but assignment statements need not have the same type on both sides of the assignment operator.