CS100J 8 March 2005 More on loops. Reading: Secs 7.1–7.3 Do the self-review exercises on pp. 235 and 242!!!

Quotes for the Day:

Instead of trying out computer programs on test cases until they are debugged, one should prove that they have the desired properties. John McCarthy, 1961, A basis for a mathematical theory of computation.

Testing may show the presence of errors, but never their absence. Dijkstra, Second NATO Conf. on Software Engineering, 1969.

A week of hard work on a program can save you 1/2 hour of thinking. Paul Gries, CS, University of Toronto, 2005.

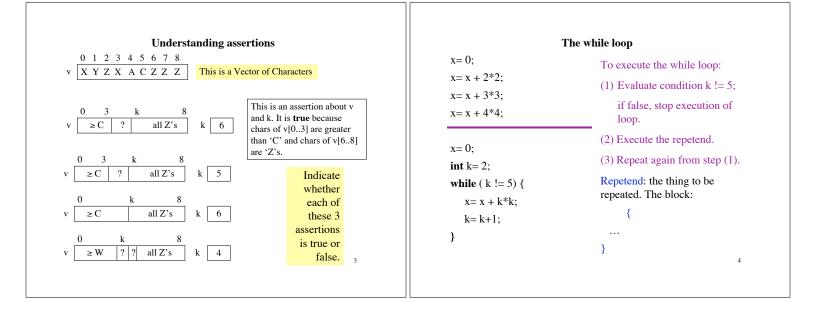
BOOM BITS ON YOUR MIND!!

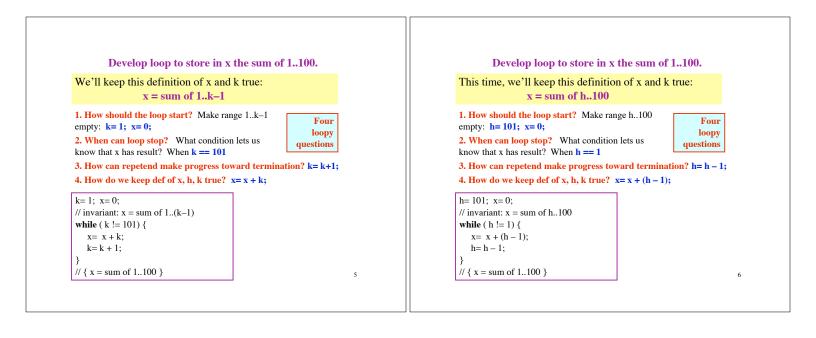
Wednesday, 9 March, 4PM - 6PM, Duffield Atrium

Showcase for 55 student computing projects

Understanding assertions

Suppose this assertion is true:	Put your answer here		
x = sum of 1k Under what extra condition is this one true? x = sum of 1n			
		Suppose this assertion is true:	Put your answer here
		x = sum of h10	
Under what extra condition is this one true?			
x = sum of 110			
Suppose this assertion is true:	Put your answer here		
no value in 2k divides x			
Under what extra condition is this one true?			
no value in 2n-1 divides x			
	2		





Develop a loop (with initialization) to store in x the minimum of p*p-p for p in the range h..k.

E.g. for h..k the range -2..0, it's min of $(-2)^*(-2) - 2$, $(-1)^*(-1) - 1$, $0^*0 - 0$

We'll keep this definition of x, h, and k true:

x = minimum of p*p - p for p in the range h..i

1. How should the loop start? i= h; x= h*h - h;

know that x has result? i == k

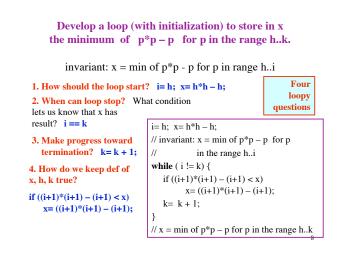
Four loopy questions

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3. Make progress toward termination? **k**= **k** + 1;

2. When can loop stop? What condition lets us

4. How do we keep def of x, h, k true? if ((i+1)*(i+1) - (i+1) < x) x= ((i+1)*(i+1) - (i+1);



Roach infestation!

/** = number of weeks it takes roaches to fill the apartmentsee p 244 of text*/
<pre>public static int roaches() {</pre>
double roachVol= .001; // Space one roach takes
double aptVol= 20*20*8; // Apartment volume
double growthRate= 1.25; // Population growth rate per week
int w= 0; // number of weeks
int pop= 100; // roach population after w weeks
<pre>// inv: pop = roach population after w weeks AND</pre>
<pre>// before week w, volume of the roaches < aptVol</pre>
<pre>while (aptVol > pop * roachVol) {</pre>
<pre>pop= (int) (pop * growthRate);</pre>
w = w + 1;
}
return w;
}
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,