

Q3.

A) The CFG picture has been attached.

B) Static Symbolic Execution is viable for this as this is a very small piece of code. We can process the code without running it and test the conditions completely. Because of the size it is possible to complete the execution and we don't face the issue of having too many branches from n to $2n$. We also don't face the issue of any infinite paths due to any unbounded loops in the program. Complexity of the program is low.

C)

Constraints to solve	Data	Observed Constraints
	null	$x == \text{null}$
$x \neq \text{null}$	{}	$x \neq \text{null} \ \&\& \ ! (x.\text{length} == 1) \ \&\& \ ! (x.\text{length} > 1)$
$x \neq \text{null} \ \&\& \ x.\text{length} == 1 \ \&\& \ ! (x.\text{length} > 1)$	{False}	$x \neq \text{null} \ \&\& \ x.\text{length} == 1 \ \&\& \ x[0] \neq \text{True} \ \&\& \ ! (x.\text{length} > 1)$
$x \neq \text{null} \ \&\& \ x.\text{length} == 1 \ \&\& \ ! (x.\text{length} > 1) \ \&\& \ x[0] == \text{True}$	{True}	$x \neq \text{null} \ \&\& \ x.\text{length} == 1 \ \&\& \ ! (x.\text{length} > 1) \ \&\& \ x[0] == \text{True}$
$x \neq \text{null} \ \&\& \ ! (x.\text{length} == 1) \ \&\& \ x.\text{length} > 1$	{True,False}	$x \neq \text{null} \ \&\& \ ! (x.\text{length} == 1) \ \&\& \ x.\text{length} > 1 \ \&\& \ x[0] \neq \text{False}$
$x \neq \text{null} \ \&\& \ ! (x.\text{length} == 1) \ \&\& \ (x.\text{length} > 1) \ \&\& \ x[0] == \text{False}$	{False,False}	$x \neq \text{null} \ \&\& \ ! (x.\text{length} == 1) \ \&\& \ (x.\text{length} > 1) \ \&\& \ x[0] == \text{False}$