Towards Precise Software Verification

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Motivating Example

```
void main(struct node *head){
 int n=0, x=0, y=0, z=0;
 struct node* curr = head;

 while (curr != NULL) {
  x = n+1;
  y = x+1;
  z = y+1;
  n = 3*n+5;
  curr->data = n;
  curr = curr->next;
 }
 curr = head;
 while (curr != NULL) {
  if (curr->data > x + y + z)
  { curr->next = head; break; }
  curr = curr->next;
 }
 curr = head;
 while (curr != NULL) {
  assert(curr->next != head);
  curr = curr->next;
 }
}
```

Problem & The Solution

```
void main(struct node *head){
 int n=0, x=0, y=0, z=0;
 struct node* curr = head;

 while (curr != NULL) {
  x = n+1;
  y = x+1;
  z = y+1;
  n = 3*n+5;
  curr->data = n;
  curr = curr->next;
// n - increasing
// n <= x + y + z
// curr->data <= n
 }
// head - Acyclic list
```

```
curr = head;
while (curr != NULL) {
 if (curr->data > x + y + z) //FALSE
 {
  curr->next = head;   //CYCLIC
  break;
 }
 curr = curr->next;
}

curr = head;
while (curr != NULL) {
 assert(curr->next != head); //SAFE
 curr = curr->next;
}
}
```

A Generic Framework