Towards Precise Software Verification

Divyesh Unadkat

guided by Prof. Supratik Chakraborty, IIT Bombay Prof. Ashutosh Gupta, TIFR

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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;
  }
}
```

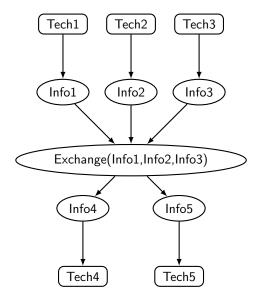
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Problem & The Solution

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

A Generic Framework



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