THE UNIVERSITY OF MELBOURNE

SWEN90010 High Integrity System

Workshop 9 Spark Pointer

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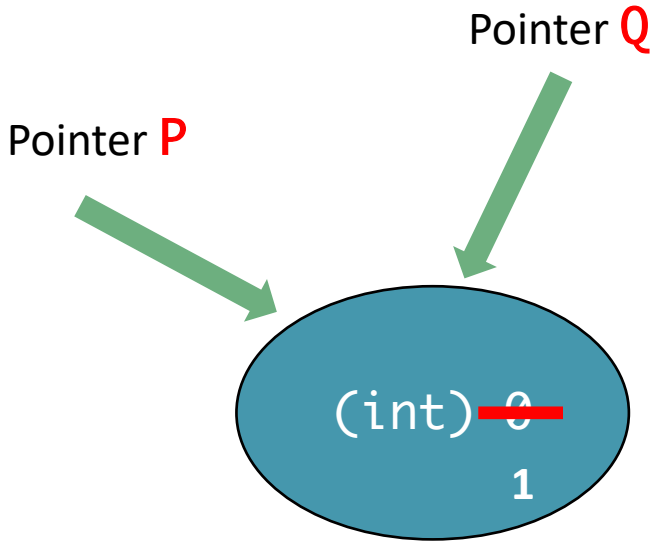
1. Recap

Problem of Alias

```
int x = P;

Q = P;

Q <- 1;
```



- The value of x???

  x is no longer equal to the content referenced by pointer P !

- Problem of Alias

  Changing one things ends up changing something else, which makes reasoning your program harder!

SPARK Prover

- This is where Spark prover comes in as it can detect illegal alias.

- You can use multiple pointers to point same piece of memory.
- You cannot use the old reference to look up the memory.

Pointer in Spark

```
procedure Pass_By_Reference is
   type Rec is record
      X : Integer;
   end record;

   type RecPtr is access all Rec;

   R : aliased Rec;

   procedure Print_R is
   begin
      Put("R.X: "); Put(R.X); New_Line;
   end Print_R;

   procedure CheckR(givenR : in RecPtr) is
   begin
      Put("In CheckR"); New_Line;
      givenR.X := R.X + 1;
      Print_R;
   end CheckR;

begin
   R.X := 5;
   CheckR(R'Access);
   Put("CheckR done"); New_Line;
   Print_R;

end Pass_By_Reference;
```

pointer type

allows constructing pointers to R

takes a pointer as its argument

constructing a pointer to R

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2. Exercise

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Thank you !