

Falcon example

section .data

align 8

heap_cursor:

dq 0

closure_of_f:

dq 0x8000000000000000, 1, fn_f

closure_of_g:

dq 0x8000000000000000, 3, fn_g

```
def f h =
```

```
  h 4
```

```
end
```

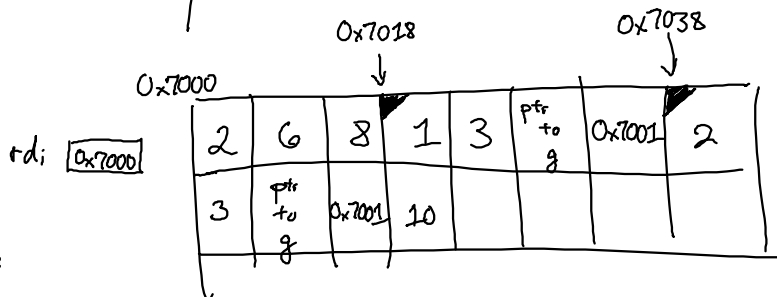
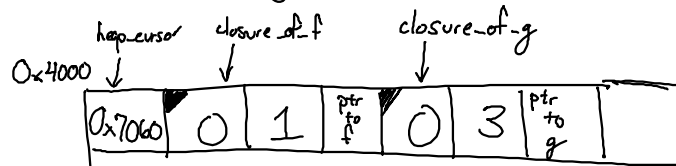
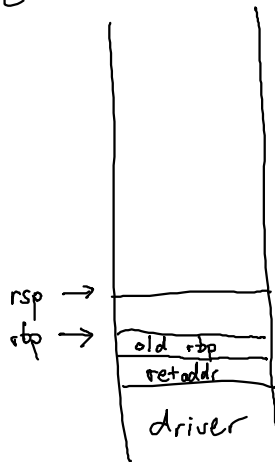
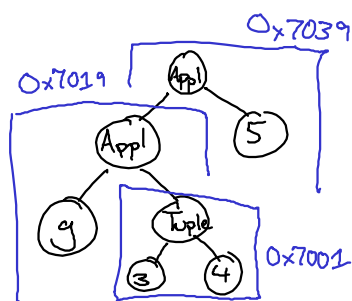
```
def g a b c =
```

```
  a[0] + a[1] + b + c
```

```
end
```

```
f (g (3, 4) 5)
```

0x7019

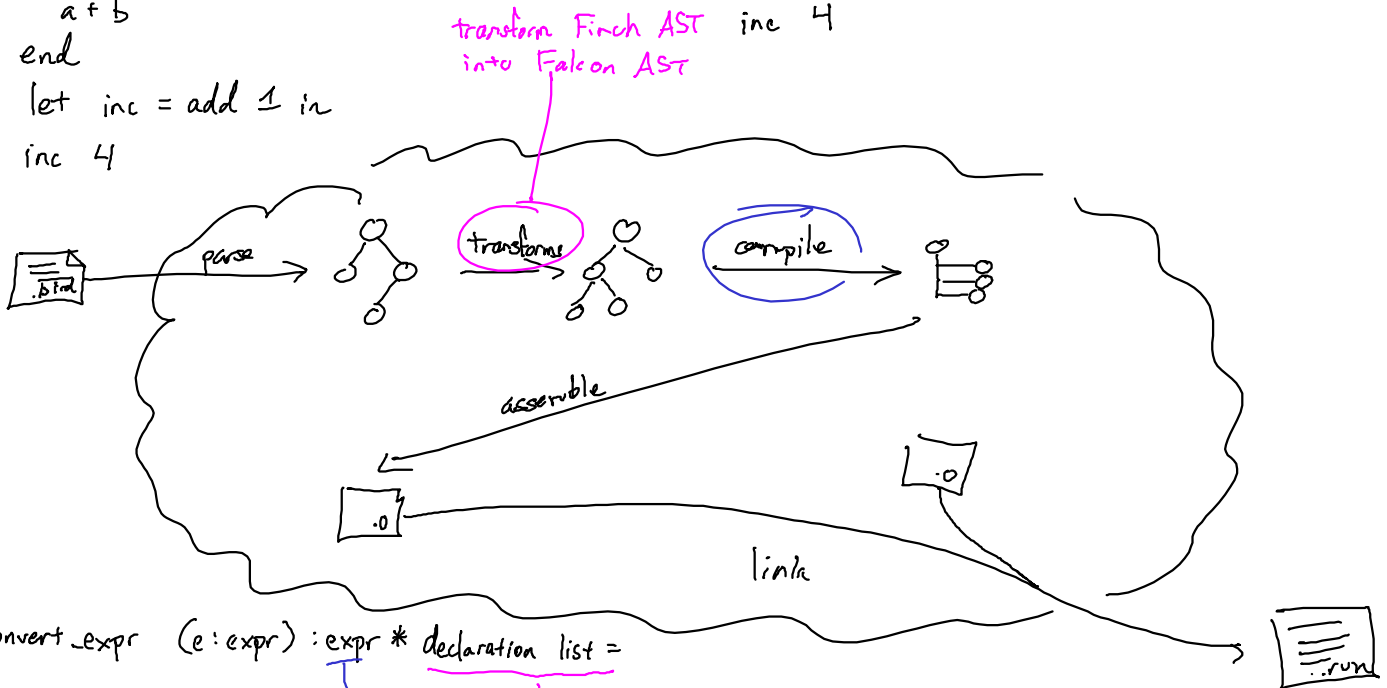


Finch

$\langle \text{expr} \rangle ::= \dots \mid \text{fun } \langle \text{param-list} \rangle \rightarrow \langle \text{expr} \rangle$

```
def add a b =
  a + b
end
```

```
let inc = (fun a b → a + b) 1 in
inc 4
```



transform Finch AST into Falcon AST

let rec closure_convert_expr (e: expr) : expr * declaration list =
...

```
let inc = (fun a b → a + b) 1 in
inc 4
```

```
def $0 a b =
  a + b
end
let inc = $0 1 in
inc 4
```

a is free

```
def f a =
  (fun b → a + b)
end
let q = f 2 in
q 5
```

```
def $0 a b =
  a + b
end
def f a
  $0 a
end
let q = f 2 in
q 5
```