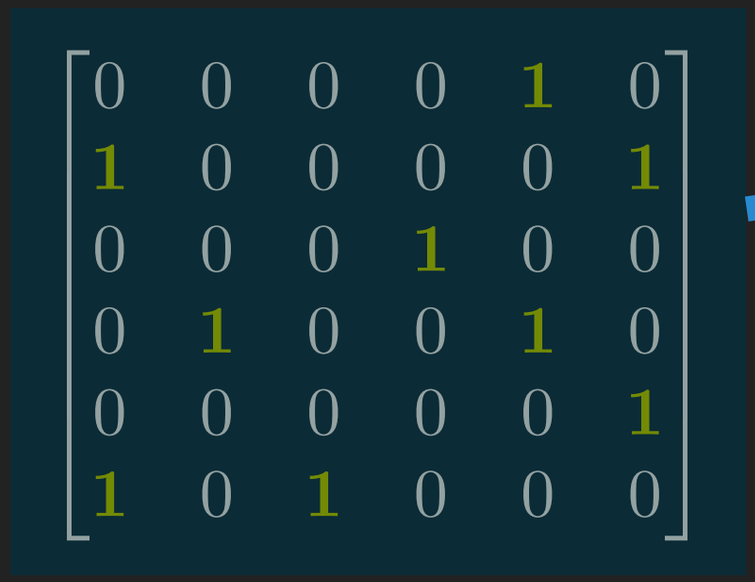
ADAM HARRIES

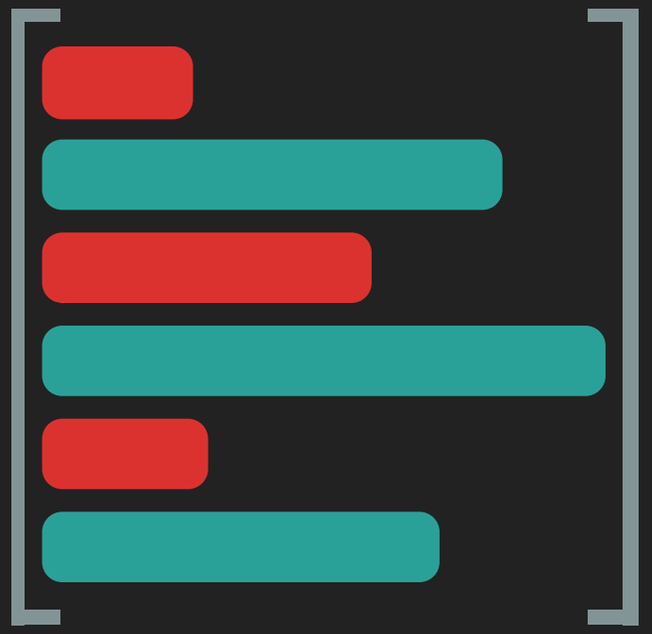
SPARSITY AND IRREGULARITY

+ FUTURE WORK

SPARSE DATA STRUCTURES IN LIFT

Research: Adding data structure primitives to support sparse data layouts



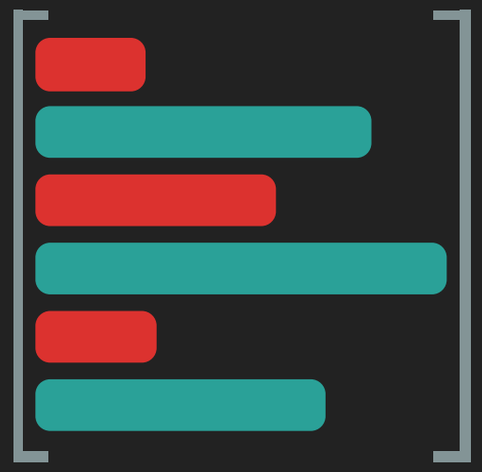


- Extend Lift language with notion of `Dynamic` arrays
- Composable array structure with low level space optimisations

```
StaticArray(
  DynamicArray((Int, T))
,M)
```

LOAD BALANCING PRIMITIVES

Research: introducing dynamic work assignment in a compositional manner

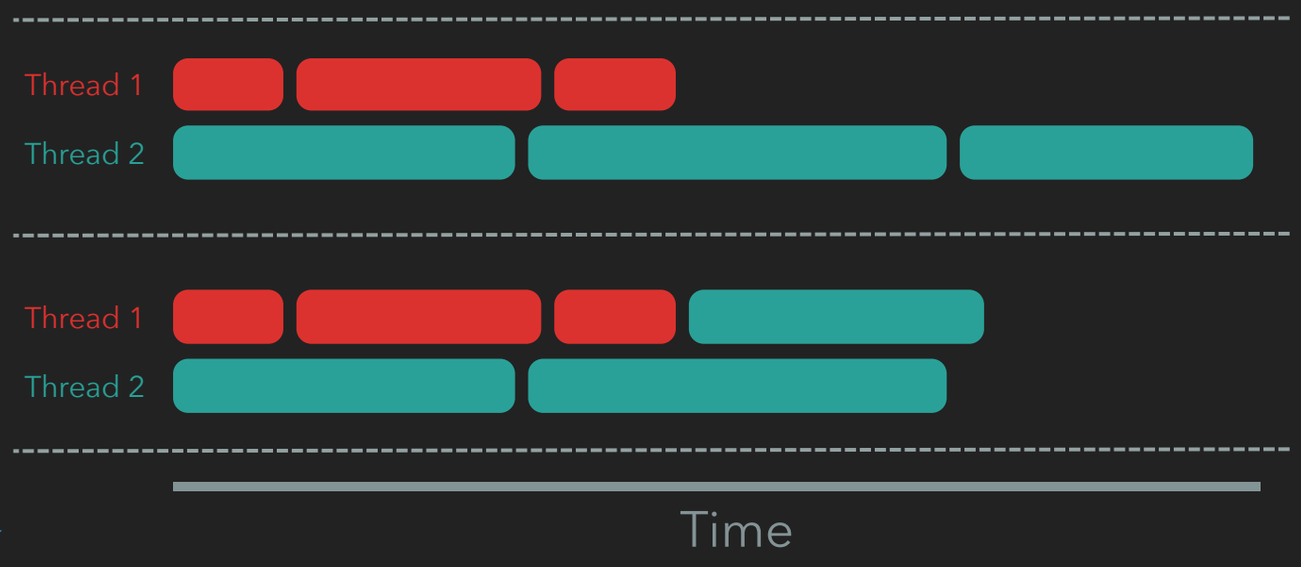


- Extending set of primitives in lift with dynamic load balancing variants
- Maintaining composition while mitigating irregularity

```
Map(
  λ(row → …),
  matrix
)
```

MapStatic

MapDynamic



FUTURE WORK

Research: Lifting Lift out of the GPU

```
Map(
  λ(row → …),
  matrix
)
```

KERNEL CODEGEN

OPENCL KERNEL

FUTURE WORK

Research: Lifting Lift out of the GPU