Programmer som Data - Assignment 6

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7.1

```
> run (fromFile "/Users/bastjansejberg/Documents/GitHub/CatSquish-PAD-2023/assig- nment-6/MicroC/ex
1.c") [17];;
17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
val it : Interp.store = map [(0, 0)]

> run (fromFile "/Users/bastjansejberg/Documents/GitHub/CatSquish-PAD-2023/assig- nment-6/MicroC/ex
11.c") [8];;
1 5 8 6 3 7 2 4
1 6 8 3 7 4 2 5
1 7 4 6 8 2 5 3
1 7 5 8 2 4 6 3
2 4 6 8 3 1 7 5
2 5 7 1 3 8 6 4
2 5 7 4 1 8 6 3
2 6 1 7 4 8 3 5
2 6 8 3 1 4 7 5
2 7 3 6 8 5 1 4
2 7 5 8 1 4 6 3
2 8 6 1 3 5 7 4
3 1 7 5 8 2 4 6
3 5 2 8 1 7 4 6
3 5 2 8 6 4 7 1
3 5 7 1 4 2 8 6
3 5 8 4 1 7 2 6
3 6 2 5 8 1 7 4
3 6 2 7 1 4 8 5
3 6 2 7 5 1 8 4
3 6 4 1 8 5 7 2
3 6 4 2 8 5 7 1
3 6 8 1 4 7 5 2
3 6 8 1 5 7 2 4
3 6 8 2 4 1 7 5
3 7 2 8 5 1 4 6
3 7 2 8 6 4 1 5
3 8 4 7 1 6 2 5
4 1 5 8 2 7 3 6
4 1 5 8 6 3 7 2
4 2 5 8 6 1 3 7
4 2 7 3 6 8 1 5
4 2 7 3 6 8 5 1
4 2 7 5 1 8 6 3
4 2 8 5 7 1 3 6
4 2 8 6 1 3 5 7
4 6 1 5 2 8 3 7
4 6 8 2 7 1 3 5
4 6 8 3 1 7 5 2
4 7 1 8 5 2 6 3
4 7 3 8 2 5 1 6
4 7 5 2 6 1 3 8
4 7 5 3 1 6 8 2
4 8 1 3 6 2 7 5
```

7.2

A

```
> run (fromFile "/Users/bastjansejberg/Documents/GitHub/CatSquish-PAD-2023/assig]
- nment-6/Exercise_7.1-7.2/arrsum.c") [];;
37 val it : Interp.store =
  map
    [(-1, 37); (0, 4); (1, 7); (2, 13); (3, 9); (4, 8); (5, 1); (6, -1);
     (7, 4);   ?.]
```

*For exercise 7.2 A refer to the file arrsum.c in the folder **Exercise_7.1-7.2**.*

B

```
> run (fromFile "/Users/bastjansejberg/Documents/GitHub/CatSquish-PAD-2023/assig]
- nment-6/Exercise_7.1-7.2/squares.c") [];;
0 1 5 14 30 55 91 140 204 285 385 506 650 819 1015 1240 1496 1785 2109 2470 2470
 val it : Interp.store =
  map
    [(-1, 2470); (0, 20); (1, 0); (2, 1); (3, 4); (4, 9); (5, 16); (6, 25);
     (7, 36);   ?.]
```

*For exercise 7.2 B refer to the file squares.c in the folder **Exercise_7.1-7.2**.*

B

```
> run (fromFile "/Users/bastjansejberg/Documents/GitHub/CatSquish-PAD-2023/assig]
- nment-6/Exercise_7.1-7.2/histogram.c") [];;
1 4 2 0 val it : Interp.store =
  map
    [(0, 1); (1, 2); (2, 1); (3, 1); (4, 1); (5, 2); (6, 0); (7, 0); (8, 1);
       ?.]
```

*For exercise 7.2 C refer to the file squaresum.c in **Exercise_7.1-7.2**.*

7.3

```
> run (fromFile "arrsum.c") [];;
37 val it: Interp.store =
  map
    [(-1, 37); (0, 4); (1, 7); (2, 13); (3, 9); (4, 8); (5, 1); (6, -1);
     (7, 4); ...]

> run (fromFile "histogram.c") [];;
1 4 2 0 val it: Interp.store =
  map
    [(0, 1); (1, 2); (2, 1); (3, 1); (4, 1); (5, 2); (6, 0); (7, 0); (8, 1);
     ...]

> run (fromFile "squares.c") [];;
0 1 5 14 30 55 91 140 204 285 385 506 650 819 1015 1240 1496 1785 2109 2470 2470 val it: Interp.store =
  map
    [(-1, 2470); (0, 20); (1, 0); (2, 1); (3, 4); (4, 9); (5, 16); (6, 25);
     (7, 36); ...]
```

*Refer to the files **CLex.fsl**, **CPar.fsy**, **arrsum.c**, **histogram.c** and **squares.c** in the folder **Exercise_7.3**.*

7.4

```
| PreInc of string * access        (* C/C++/Java/C# ++i or ++a[e] *)
| PreDec of string * access        (* C/C++/Java/C# --i or --a[e] *)
```

*Refer to the file **Absyn.fs** line **26** and **27** in the folder **Exercise_7.4-7.5***

```
| PreInc(ope, a) →
  let address = (access a locEnv gloEnv store ▷ fst)
  let currStore = getSto store address
  let setNewStore = setSto store address (currStore + 1)
  (currStore + 1, setNewStore)
| PreDec(ope, a) →
  let address = (access a locEnv gloEnv store ▷ fst)
  let currStore = getSto store address
  let setNewStore = setSto store address (currStore - 1)
  (currStore - 1, setNewStore)
```

*Refer to the file **Interp.fs** line **197-206** in the folder **Exercise_7.4-7.5***

4

7.5

```
> open ParseAndRun;;
> run (fromFile "assignment-6\Exercise-7.4\ex1.c") [-5];;
-5 -4 -3 -2 -1
val it: Interp.store = map [(0, 0)]


>    run (fromFile "assignment-6\Exercise-7.4\ex1.c") [17];;
17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
val it: Interp.store = map [(0, 0)]
```

*Refer to the files **CLex.fsl** and **CPar.fsl** in the folder **Exercise_7.4-7.5***

*NOTE: we modified the file **ex1.c** in order to test '++' and '--'*