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FILE: hw7-writeup.pdf
DATE: Spring 2023
DESC: This pdf will provide a short description of any challenges
and/or issues I faced and how I addressed them in this assignment.

Challenges faced:
    I faced many challenges in this assignment, the majority of which
came from shadowing and how to handle variables. I was having
difficulties figuring out what addresses to store variables in,
especially when pushing and popping a new environment. The solution I
came to was to store the current var_index before starting a new
environment, then after popping the environment I set the new
var_index to the old one.
    The main portion of my time debugging was figuring out issues in
the example files. I flew through the g-test tests fairly quickly but
was then humbled by the example files. The most complicated one for me
was exec-arrays.mypl and exec-sum-to-prime.mypl.

Testing:

All Tests Passing

Custom Programs

Example files output

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-arrays-structs.mypl
should be 20: 20
should be 10: 10
should be 30: 30
should be 5: 5
should be 15: 15
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-arrays.mypl
should be [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
should be [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]: [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
should be [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]: [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]
should be [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]: [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-basic-function.mypl
... in f1
Should be 7: 7
... in f2, x = ab
... in f3, after f2, x = abab
Should be abab: abab
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-built-ins.mypl
Normal String
String with      tab
42
3.141590
7
f
o
Enter a string: ben
ben
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-catalan-nums.mypl
Catalan number 0 = 1
Catalan number 1 = 1
Catalan number 2 = 2
Catalan number 3 = 5
Catalan number 4 = 14
Catalan number 5 = 42
Catalan number 6 = 132
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-cond.mypl
Should be 0: 0
Should print else case: else case
Should print elseif case: elseif case
Should print else case: else case
Should print oops: oops
should be 1 2 ... 6: 1 2 3 4 5 6
should be 5 4 ... 0: 5 4 3 2 1 0
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 %
```

```
● (base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-
 expr.mypl
 String Tests:
   Should be true 'abc' < 'abd': true
   Should be true 'abc' <= 'abd': true
   Should be true 'abd' > 'abc': true
   Should be true 'abc' >= 'abc': true
   Should be true 'abc == 'abc': true
   Should be true 'abd != 'abc': true
 Integer Tests:
   Should be '5': 5
   Should be '9': 9
   Should be '6': 6
   Should be '6': 6
   Should be '1': 1
   Should be '2': 2
   Should be '-1': -1
   Should be true 3 < 4: true
   Should be true 3 <= 4: true
   Should be true 4 > 3: true
   Should be true 4 >= 3: true
   Should be true 4 == 4: true
   Should be true 4 != 3: true
   Should be true not 4 != 4: true
 Double Tests:
   Should be '5.500000': 5.500000
   Should be '9.250000': 9.250000
   Should be '6.750000': 6.750000
   Should be '9.375000': 9.375000
   Should be '1.750000': 1.750000
   Should be '2.080000': 2.080000
   Should be '-3.400000': -3.400000
   Should be true 3.1 < 4.2: true
   Should be true 3.1 <= 4.2: true
   Should be true 4.2 > 3.1: true
   Should be true 4.2 >= 3.1: true
   Should be true 4.2 == 4.2: true
   Should be true 4.2 != 3.1: true
 Bool Tests:
   Should be true (not false): true
   Should be true (true and true): true
   Should be true (not false and true): true
   Should be true ((not false) and true): true
   Should be true (not (true and false)): true
   Should be true (true or false): true
   Should be true (false or true): true
   Should be true (false or (not false)): true
   Should be true (not false or false): true
 Char Tests:
   Should be true 'a' < 'b': true
   Should be true 'a' <= 'a': true
   Should be true 'd' > 'c': true
   Should be true 'b' >= 'a': true
   Should be true 'a' == 'a': true
   Should be true 'b' != 'a': true
```

```
● (base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-fac.mypl
 the factorial of 12 is 479001600
```

```
● (base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-fib.mypl
 fib(0) = 0
 fib(1) = 1
 fib(2) = 1
 fib(3) = 2
 fib(4) = 3
 fib(5) = 5
 fib(6) = 8
 fib(7) = 13
 fib(8) = 21
 fib(9) = 34
 fib(10) = 55
 fib(11) = 89
 fib(12) = 144
 fib(13) = 233
 fib(14) = 377
 fib(15) = 610
 fib(16) = 987
 fib(17) = 1597
 fib(18) = 2584
 fib(19) = 4181
 fib(20) = 6765
 fib(21) = 10946
 fib(22) = 17711
 fib(23) = 28657
 fib(24) = 46368
 fib(25) = 75025
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-hello.mypl
Hello World!
```

```
should be [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]: [9, 10, 7, 8, 5, 6, 3, 4, 1, 2]
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-linked-list.mypl
[10, 20, 30, 40, 50]
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 %
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-more-structs.mypl
Should be 0: 0
Should be 1: 1
Should be 5: 5
Should be 3: 3
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-nested-if.mypl
test 1: pass
test 2: pass
test 3: pass
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 %
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-simple-struct.mypl
t1.x should be 0: 0
t1.y should be 1: 1
t1.x should now be 5: 5
t1.y should now be 6: 6
t1.x should now be 7: 7
t1.y should now be 8: 8
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-sum-to-prime.mypl
Please enter integer values to sum (prime number to quit)
>> Enter an int: 10
>> Enter an int: 20
>> Enter an int: 4
>> Enter an int: 5
The sum is: 34
Goodbye!
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-tree.mypl
Tree Values: 1 2 5 7 10 12 13 14 15
Tree Height: 5
```

```
(base) benpuryear@Bens-MacBook-Pro-6 hw7-Ben10164 % ./mypl examples/exec-while.mypl
1, 1, 1
1, 1, 2
1, 1, 3
1, 2, 1
1, 2, 2
1, 2, 3
1, 3, 1
1, 3, 2
1, 3, 3
2, 1, 1
2, 1, 2
2, 1, 3
2, 2, 1
2, 2, 2
2, 2, 3
2, 3, 1
2, 3, 2
2, 3, 3
3, 1, 1
3, 1, 2
3, 1, 3
3, 2, 1
3, 2, 2
3, 2, 3
3, 3, 1
3, 3, 2
3, 3, 3
```