INTRO. TO PROGRAMMING MID 1

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Number base conversion

- From base b into decimal:

$$(a_k a_{k-1} \ldots a_1 a_0)_b = a_k b^k + a_{k-1} b^{k-1} + \ldots + a_1 b + a_0 = \sum_{i=0}^{k} a_i b^i$$

- From decimal to base b: keep dividing b, read the remainder in reversed order

$$666 = 41 \times 16 + \underline{10} \; 41 = 2 \times 16 + \underline{9} \; 2 = 0 \times 16 + \underline{2} \Rightarrow (666)_{10} = (29A)_{16}$$

- Convert between binary and hexadecimal: group 4 digits in a roll

$$2_{16} = (0010)_2 \; 9_{16} = (1001)_2 \; A_{16} = (1010)_2 \Rightarrow (29A)_{16} = (1010011010)_2$$

How to write an algorithm?

- Input
- Output

(usually specified in the description. If not, state yours in README)

- Recipe (Procedure)

Exam - Part A (25 minutes)

- **Closed-book. No calculator.**
- Content:

A. Lecture slides. Pay attention to the questions on the green slides.

B. Project info.

Easy if you completed the project. Improper answer may cause deduction.

C. Coding ability. Able to read simple code.

- 5 minutes break afterwards.

Exam - Part B (75 minutes)

- Lecture slides with notes are allowed.

  Don’t try to write the whole project on it.

- 3 problems.

- Several questions with different weight.

Exam - Tips

- **Read through the exam paper.**
- Choose wisely according to the difficulty and weight, for it’s hard to finish all the problems.
- Use *help* and *doc* when encountering unfamiliar stuff.

Debug - Tips

- Try with input of smaller size.

- Use breakpoint and workspace to locate where the error occurs.

- Use *disp()* or delete ; to directly see the output of crucial steps.

Debug - Tips

- Read the warning and error message.

```
>> clear all;
>> a=b+1
Undefined function or variable 'b'.
```

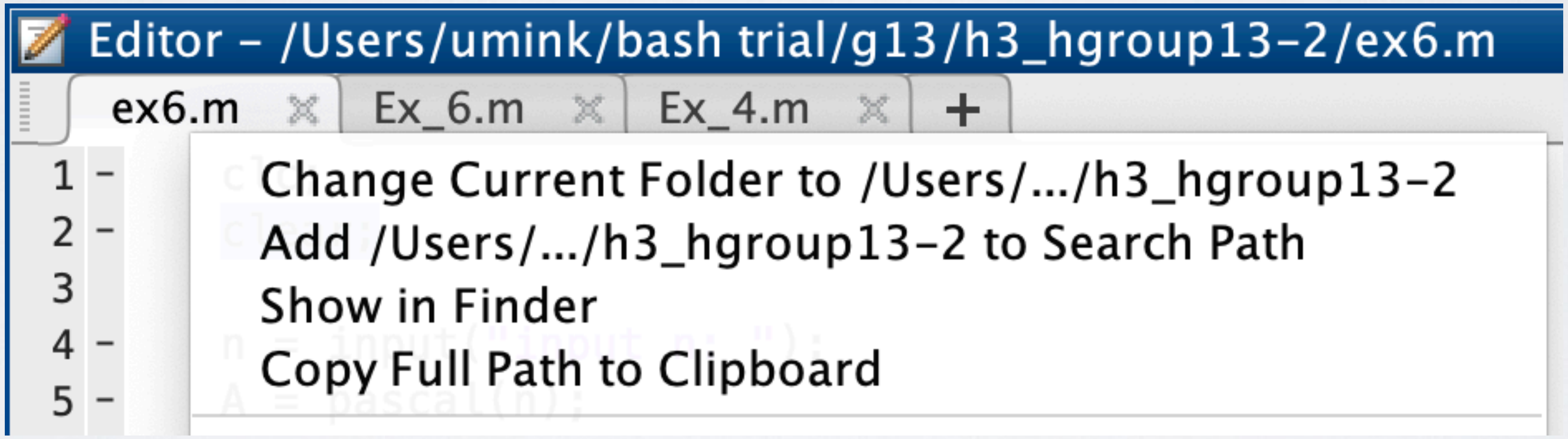
```
>> a=[1:10];
>> a(0)
Array indices must be positive integers or
logical values.
```

```
>> a(5)=5; disp(a(1))
     0

>> disp(a(6))
Index exceeds the number of array elements (5).
```

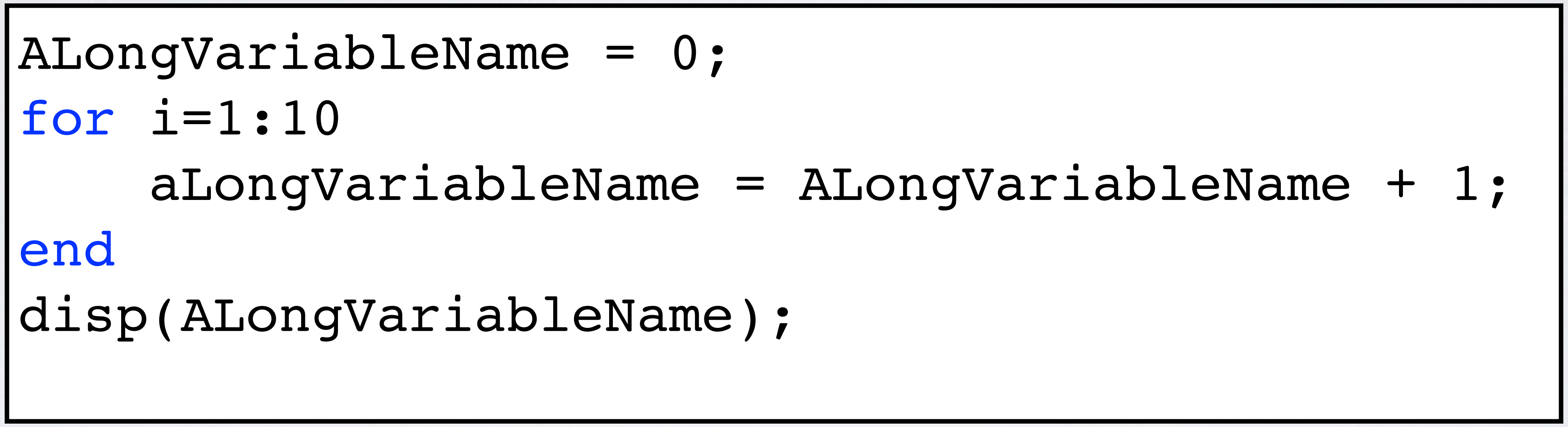
Common bugs

- Current Folder

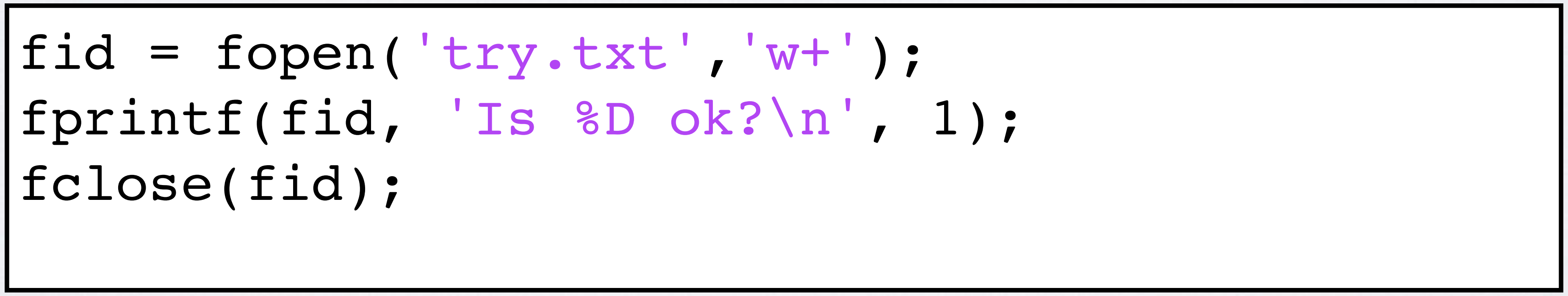

Editor – /Users/umink/bash trial/g13/h3_hgroup13-2/ex6.m
ex6.m
Ex_6.m
Ex_4.m
+
Change Current Folder to /Users/.../h3_hgroup13-2
Add /Users/.../h3_hgroup13-2 to Search Path
Show in Finder
Copy Full Path to Clipboard

Common bugs

- Case Sensitive



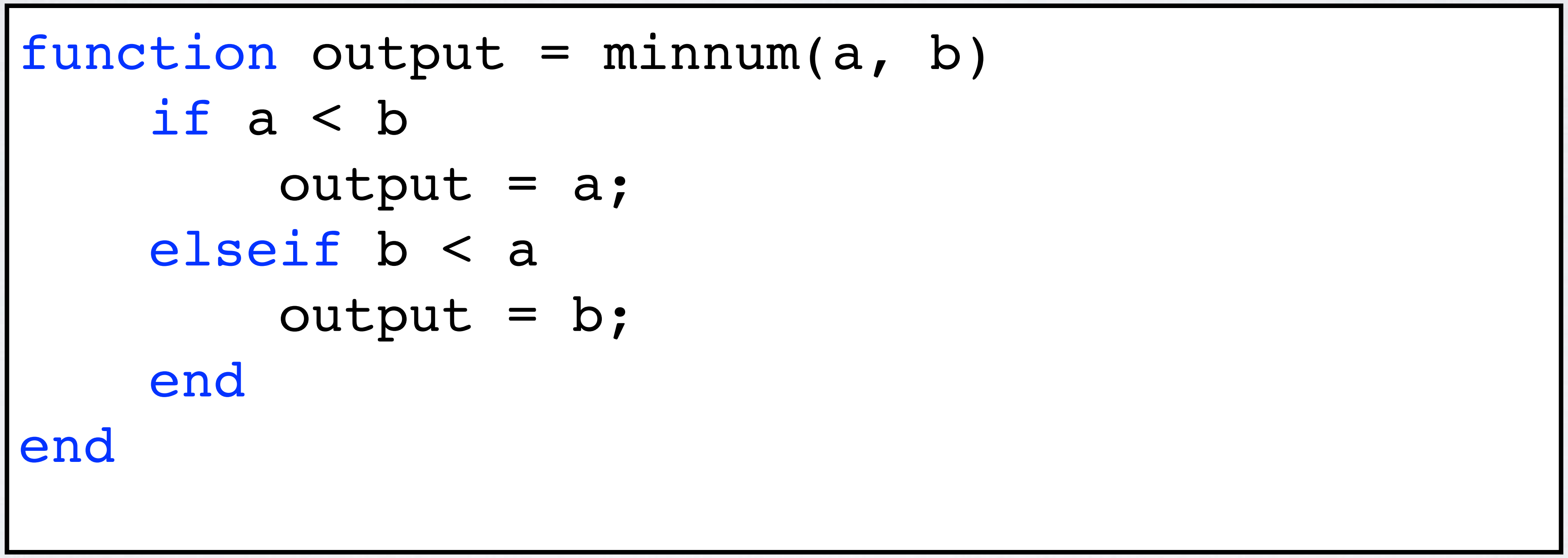
```
ALongVariableName = 0;
for i=1:10
    aLongVariableName = ALongVariableName + 1;
end
disp(ALongVariableName);
```



```
fid = fopen('try.txt','w+');
fprintf(fid, 'Is %D ok?\n', 1);
fclose(fid);
```

Common bugs

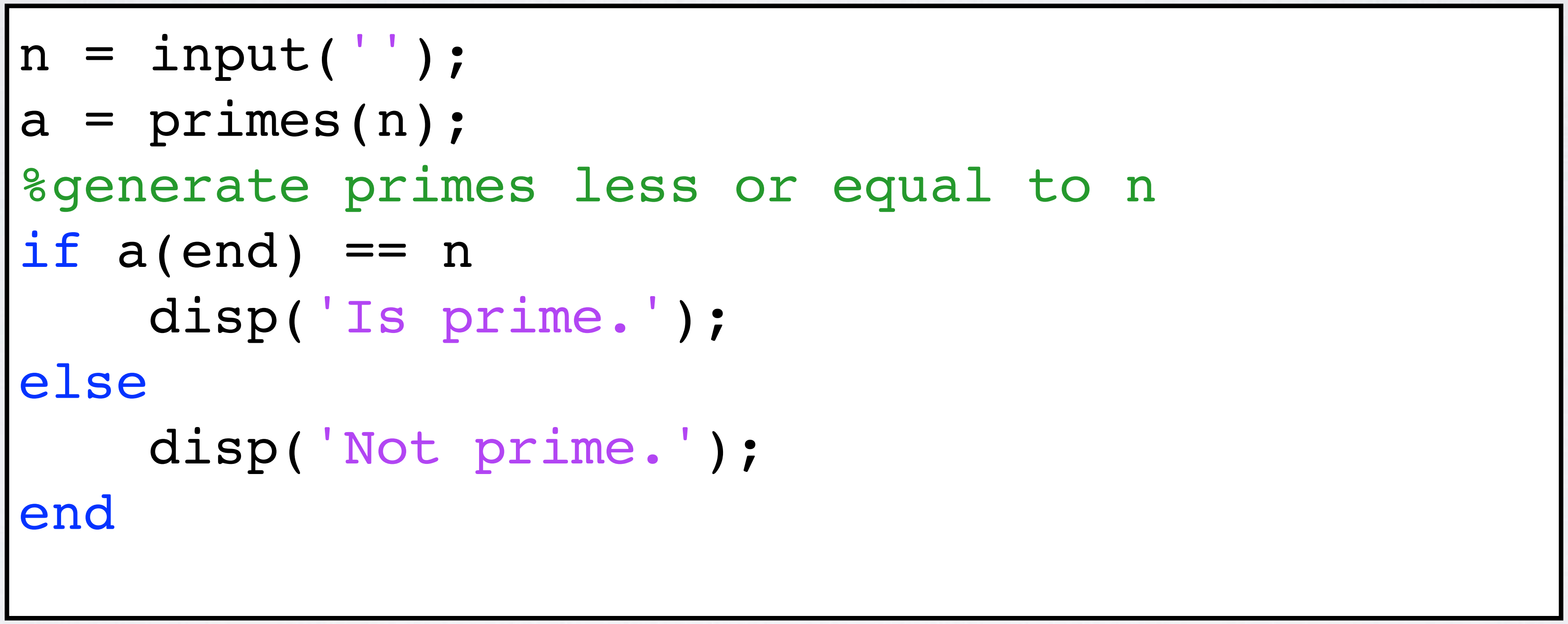
- Default Case



```
function output = minnum(a, b)
    if a < b
        output = a;
    elseif b < a
        output = b;
    end
end
```

Common bugs

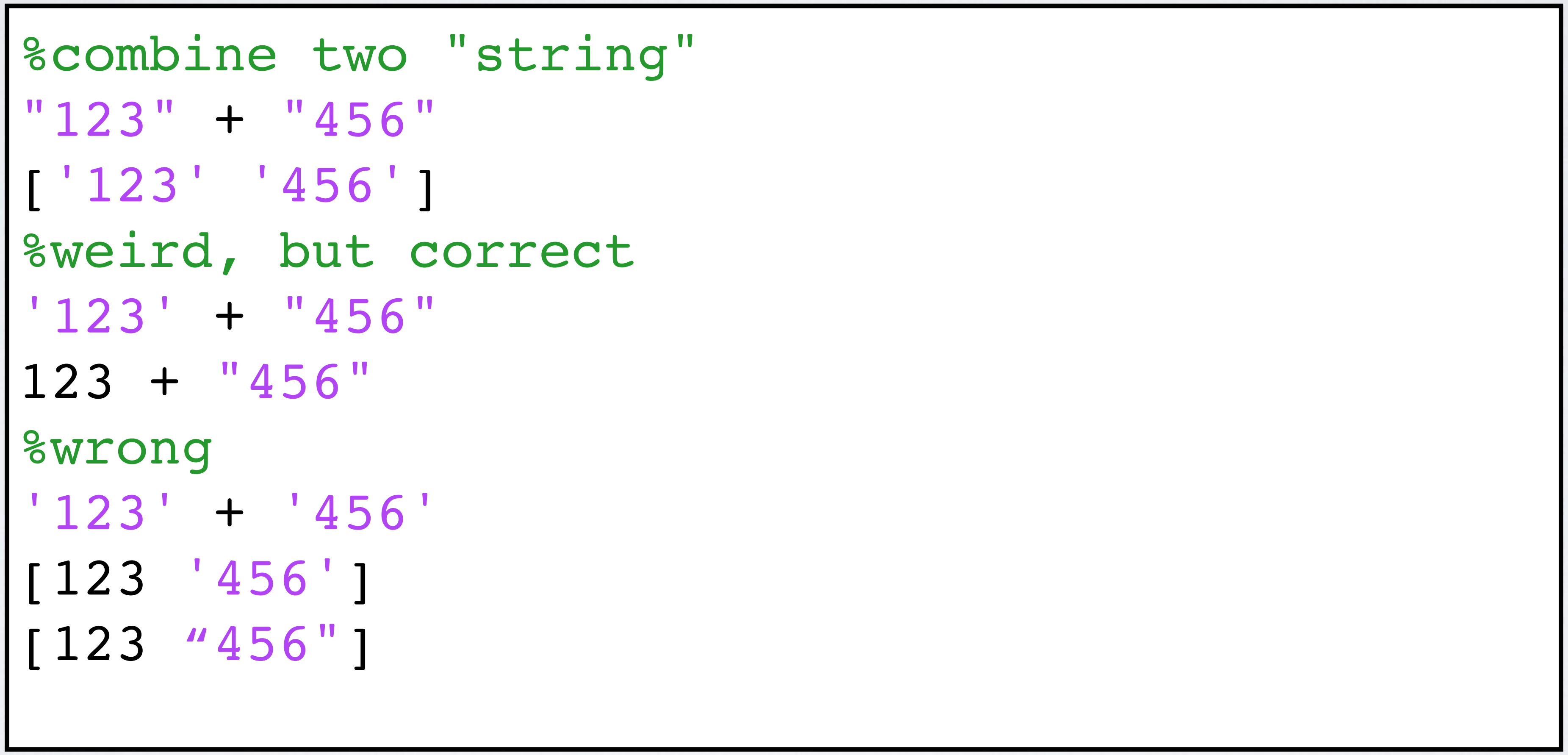
- Boundary Case



```
n = input('');
a = primes(n);
%generate primes less or equal to n
if a(end) == n
    disp('Is prime.');
else
    disp('Not prime.');
end
```

Common bugs

- String and Char



```
%combine two "string"
"123" + "456"
['123' '456']
%weird, but correct
'123' + "456"
123 + "456"
%wrong
'123' + '456'
[123 '456']
[123 “456"]
```

GOOD LUCK!