

Work with your neighbor. (This will be graded for participation only.)

1. Consider the following code snippet (there is other code around this that is not shown). Here, `itemlist` is a Python list while `my_dict` is a dictionary.

```
index = int(input()).           # line 0
infile = open("data.txt")       # line 1
base = int(infile.read())        # line 2
value = base + index            # line 3
itemlist[value//index] = my_dict[base]  # line 4
```

- (a) Name four different exceptions that can give occur in the code fragment shown. In each case, give the line number where the exception can arise. **Note:** `index` is a valid integer. Not all line(s) have errors.

Line 1: _____

Line 2: _____

Line 3: _____

Line 4: _____

2. Download the program `propagate.py`. Make two copies of it.

- a) Modify the code to catch the exception in `fun2()`. Print out an error message in the `except` body statement.

In which function does the error occur?

Which function catches the error?

What does `fun2()` return if the exception occurs?

Does the program end when the exception occurs?

- b) Modify the code to catch the exception in `main()`. Print out an error message in the `except` body statement.

In which function does the error occur?
Which function catches the error?

Final exam review (general programming, stacks, and hashing)

3. (General Programming) Write a snippet of code (not a full function) which prints out all of the powers of 2, from 1 to n . If n is **not** a power of two, stop after printing the power of 2 that follows it. (Remember the powers of 2 are 2^0 , 2^1 , 2^2 , ... That is, they are 1, 2, 4, ...) Examples: if $n == 17$, then print 1, 2, 4, 8, 16, 32 on separate lines. If $n == 4$, print 1, 2, and 4 on separate lines.
4. (References) What is an alias in Python? Demonstrate how an alias can occur using a Python list. Write the code that creates an alias and show the corresponding diagram.

5. (Stacks) Write a function `is_balanced(text, lsym, rsym)` that takes three string arguments `text`, `lsym`, and `rsym` and returns `True` if `text` is balanced with respect to the strings `lsym` and `rsym` and `False` otherwise. For example,

```
is_balanced("(a + b) * 3 + 8 * (j + 4)", "(", ")")
```

returns `True` and

```
is_balanced("[4, 6, [8, 2], [3, ]", "[", "]")
```

returns `False`. Use a Stack ADT to implement your solution. You may assume that the Stack has operations `push(item)`, `pop()`, and `is_empty()` defined.

<ICA is continued on next page.>

6. Suppose you are given the hash and probe decrement functions below:

$$\text{hash}(\text{key}) = \text{key} \% 11$$

$$\text{probe}(\text{key}) = \max(1, \text{key} // 11)$$

- a) Fill out the columns in the table below for the **Hash value** and **Probe decrement** based on the functions defined above.

Key	Hash value	Probe decrement
19		
22		
25		
33		
36		
42		

- b) Give the final configuration of a hash table below that results from inserting the keys listed above into an empty table using double hashing. The order of insertion of the keys is: 33, 25, 36, 19, 22, 42.

0	1	2	3	4	5	6	7	8	9	10

7. We have 42,000 student names to enter as keys into a hash table. If we want a load factor of .70, what should the table size be?