

With the first exam less than one week away, we will use class time to practice problems. This is the *best* way to study for 101 exams.

1 Exercises

1. What is the output of the following program? (Follow up questions: what if `range(2)` was `range(i+1)`? what if range was left unchanged but `i + j + 1` was `2*i+1`?)

```
for i in range (3):
    for j in range(i+1):
        print '*',
    for j in range(2):
        print i + j + 1,
    print
```

Solution:

```
* 1 2
* * 2 3
* * * 3 4
```

2. Write a program that prints out a multiplication table, like this:

```
Let's print a multiplication table!
Number rows: 5
Number columns: 10
1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
4 8 12 16 20 24 28 32 36 40
5 10 15 20 25 30 35 40 45 50
```

As a challenge problem, get it to format nicely (each "cell" gets exactly 3 spaces regardless of the number of the digits in the number), like this:

```
Let's print a multiplication table!
Number rows: 4
Number columns: 15
 1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
 2   4   6   8  10  12  14  16  18  20  22  24  26  28  30
 3   6   9  12  15  18  21  24  27  30  33  36  39  42  45
 4   8  12  16  20  24  28  32  36  40  44  48  52  56  60
```

Solution:

```
print "Let's print a multiplication table!"
m = int(raw_input("Number rows: "))
n = int(raw_input("Number columns: "))

for i in range(m):
    for j in range(n):
        result = (i+1) * (j+1)
        if result < 10:
            pad = 2
        elif result < 100:
            pad = 1
        else:
            pad = 0
        print ' ' * pad + str(result),
    print
```

3. Football stat calculator: fans of the New England Patriots are worried that Tom Brady may be on the decline. Let's write a program to compute some stats. Specifically,
- Ask the user how many passes Tom Brady threw.
 - For each pass, ask how many yards were gained. The user should enter -99 if the pass was incomplete.
 - Print out completion percentage (number of completed passes / number of passes).
 - Print out average yards per completed pass. This can be computed as the *sum* of yards (counting *only* passes that were completed) divided by the number of completed passes.

Here's an example:

```
How many passes? 3
How many yards on pass 1? 12
How many yards on pass 2? -99
How many yards on pass 3? 3
Completion percentage: 0.666666666667
Average yards/catch 7.5
```

Solution:

```
passes = int(raw_input("How many passes? "))
tot = 0
completed = 0
```

```

for i in range(passes):
    yards = int(raw_input("How many yards on pass " + str(i+1) + "? "))
    if yards != -99:
        tot += yards
        completed += 1
print "Completion percentage:", float(completed)/passes
print "Average yards/catch", float(tot)/completed

```

4. Parenthetical remark eliminator. Some writers hate parenthetical remarks (though other writers find them useful). Write a program that asks the user for a phrase and then prints that phrase after removing any part that's containing within parentheses. You can assume that there is at most one '(' and at most one ')' and that if they appear, they appear in that order.

Example:

```

Enter phrase: I love the NY Jets (only kidding!)
I love the NY Jets

```

Another example:

```

Enter phrase: You love (or maybe you don't) the Patriots!
You love the Patriots!

```

Challenge problem: have your program work even if the user puts parentheses *inside* other parenthesis (what? (I know, who does that?)).

Solution:

```

phrase = raw_input("Enter phrase: ")
new_phrase = ''
inside_parens = False
for ch in phrase:
    if ch == '(':
        inside_parens = True
    elif ch == ')':
        inside_parens = False
    elif not inside_parens:
        new_phrase += ch
print new_phrase

```

5. Revisit the previous exercise but instead report the start and end index of the parenthetical remark.

Solution:

```
phrase = raw_input("Enter phrase: ")
start_idx = -1
end_idx = -1
for i in range(len(phrase)):
    if phrase[i] == '(':
        start_idx = i
    elif phrase[i] == ')':
        end_idx = i
print "Parens from", start_idx, "to", end_idx
```