15-110 Practice Exam 1

Show work when needed, it can be used for partial credit! Also note that these questions are a rough estimate and are compiled by TA's who have not seen the exam. Topics covered in class are fair game even if they are not on this exam.

Short Answer/Multiple Choice/Fill in the blank:

1. What is the smallest SIGNED integer that can be represented with 1 byte's worth of bits?

2. State if there is an error in each of the following blocks of code. If an error is found please specify the type. Otherwise write "No error"

```
num = 12
if num % 2 == 0:
        print("divisible by 3")
if num % 3 == 0:
        print("divisible by 3")
```

```
x = 5
while x > 0:
        print("Nonzero")
        x -= 1
print("x = " + x)
```

```
num  = 20
total=1
for i in range ( num):
        print(  str(num) +"!")
        total *= num
total =int("21")
print   (total)
```

```



```

```
x = 5
y = 2
if x == 5:
        y -= 2
        print("y is equal to 0")
if y == 0:
        print(x / y)
else:
        print(x is equal to " + str(x))
```

```



```

3. What is the purpose of c_in and c_out in a full adder?
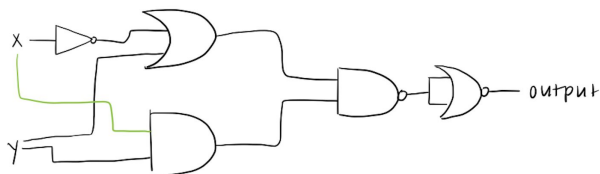
```



```

4. What would you use to sum two numbers that are greater than 1?

5. What would you use to save the state of a bit?

6. Convert 53 to binary using 10 bits

7. What is 1110 + 0101 (binary)?

8. What boolean operation is this equivalent to?

Code Tracing: Provide the outputs from the given functions

9.
```python
def ct(s, n):
        result = ''
        if len(s) % n == 0:
                result += s[:n]
        elif len(s) // n == 1:
                result += s[n:]
        else:
                return None
        return result

print(ct('Apple', 2))
print(ct('Pear', 4))
print(ct('Orange', 3))
```

10.
```python
def f(x, y, z):
        result = ''
        if (x+y)%3 == 1:
                result += str(x)
        if (y+z)%2 == 0:
                result = str(y) + result
        if z%2 == 1:
                result = result + str(z)
print( f(3,4,8), f(1,3,3))
```
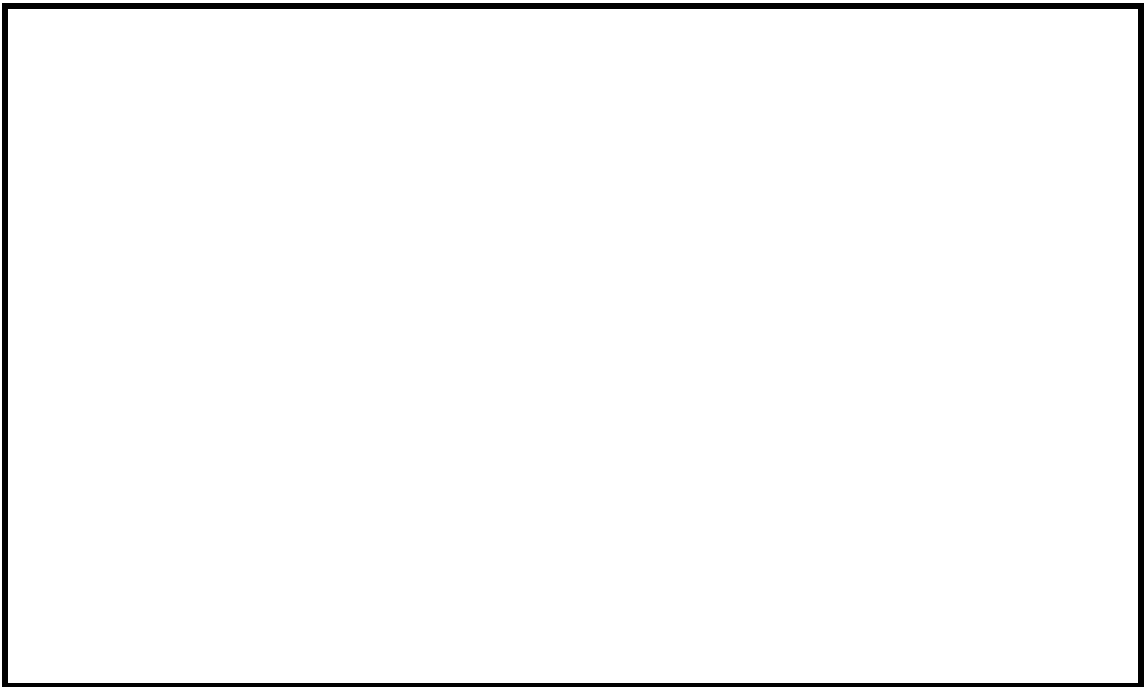
11.
```
def ct2(x, y):
        Result = 0
        for z in range (x,y):
            if (z%2==1):
                print (z, result)
                result += z%10
        return result
print(ct2(20, 30))
```
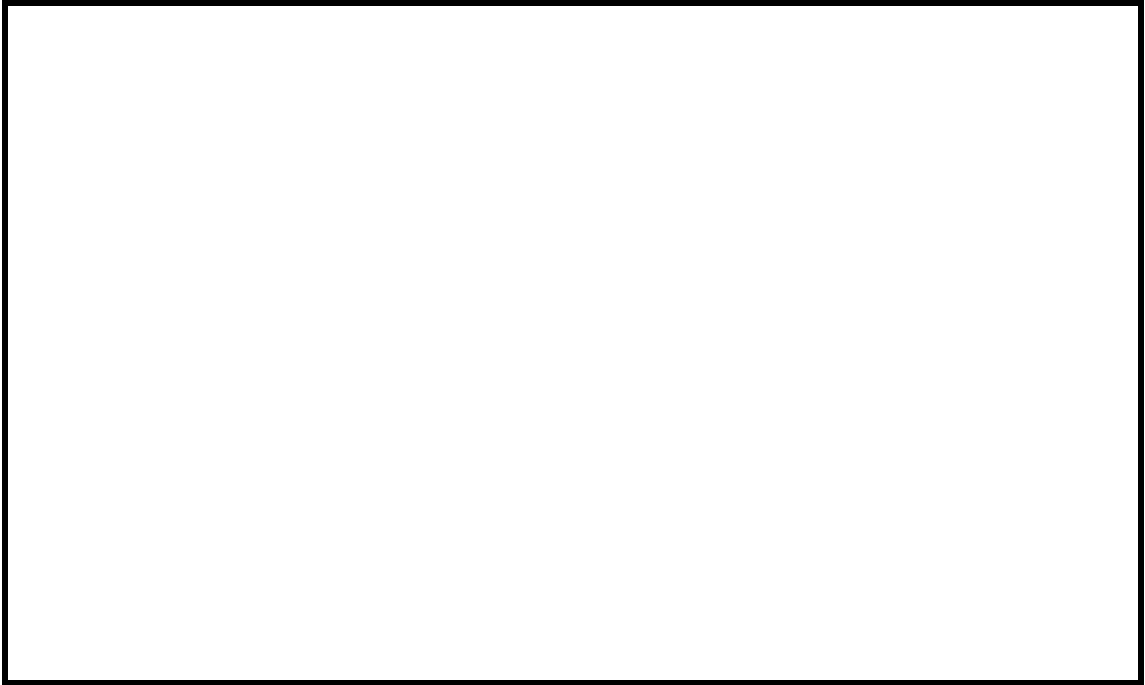

Free Response:
12. Write a function hello that takes in an integer x and prints "Hello" x times if x is not a multiple of 3. Return true if the function printed "Hello" and false otherwise.

13. Write a function stringSum that takes in a string containing numbers separated by "+" characters and return the integer sum of these numbers.

14. Convert the following flowchart into the function scheduler, which takes as input the variables day, time, and recitation.

print "Good Morning"

if day == 'Sat' or day == 'Sun'
True → print "I'm free"
False →

if day == 'Mon' or day == 'Wed' or day == 'Fri'
True →
False →

if time > 2.5 and time < 4.5
True → print "I have 110 lecture"
False → print "I'm free"

if day == "Thurs"
True →
False → print "I'm free"

if recitation - time < 1 and recitation - time > -1
True → print "I have 110 recitation"
False → print "I'm free"