CS 110
Final Exam

Instructions: This exam is governed by the **Emory Honor Code**. This exam is closed book and closed notes.

Show all of your work for full credit on each problem.

Name:

I understand and will adhere to the Emory Honor Code.

Signature:

Problem 1: (2 pts)
What is the decimal equivalent of the binary number 1101?

○ 11

○ 13

○ 15

○ 17

Problem 2: (2 pts)
Which of the following Python operators is used for exponentiation?

○ *

○ ^

○ **

○ //

Problem 3: (2 pts)
In Python, what does the expression `5 // 2` evaluate to?

○ 2.5

○ 2

○ 2.0

○ 3

Problem 4: (2 pts)
What is the result of the binary multiplication: `101 * 10`?

○ 1010

○ 110

○ 1001

○ 1110

Problem 5: (2 pts)
In Python, what is the purpose of the `else` clause in an `if-else` statement?

○ To check another condition

○ To handle exceptions

○ To execute a block of code when the condition is false

○ To create a loop

Problem 6: (2 pts)
How do you open a file named `"example.txt"` in Python for reading?

○ `file = open("example.txt", "w")`

○ `file = open("example.txt", "r")`

○ `file = read("example.txt")`

○ `file = read_file("example.txt")`

Problem 7: (2 pts)
Which of the following is used for single-line comments in Python?

○ //

○ #

○ --

○ /* */

Problem 8: (2 pts)
What is the purpose of the `__init__` method in a Python class?

○ To initialize class variables

○ To create a new instance of the class

○ To define the class constructor

○ To handle errors in the class

Problem 9: (2 pts)
What is the key difference between a `for` loop and a `while` loop in Python?

○ `for` loops are used for iteration, and `while` loops for condition-based repetition

○ `for` loops can only iterate over lists, and `while` loops can iterate over any iterable sequence

○ `while` loops are more efficient than `for` loops

○ There is no difference; they can be used interchangeably

Problem 10: (2 pts)
What is the purpose of the break statement in a loop?

○ To exit the loop immediately

○ To skip the current iteration and move to the next one

○ To restart the loop from the beginning

○ To print the current loop variable

Problem 11: (2 pts)
What is recursion in programming?

○ A loop structure

○ A function calling itself

○ A method for creating classes

○ A data type in Python

Problem 12: (2 pts)
In a recursive function, what is the base case?

○ The initial state of the function

○ The case when the function calls itself

○ The stopping condition that prevents infinite recursion

○ The return statement of the function

Problem 13: (2 pts)

What is the purpose of the continue statement in a loop?

○ To exit the loop immediately

○ To skip the current iteration and move to the next one

○ To restart the loop from the beginning

○ To print the current loop variable

Problem 14: (2 pts)

What is the purpose of the return statement in a function?

○ To print a value to the console

○ To exit the function immediately and send a value to the caller

○ To initialize the parameters of a function

○ To define a new function

Problem 15: (2 pts)

How do you access the value associated with a specific key in a dictionary named `dict`?

○ `dict[key]`

○ `dict.value(key)`

○ `dict.get(key)`

○ `dict.fetch(key)`

Problem 16: (2 pts)

What happens if you try to assign a value to a key that does not exist in a dictionary using dict[key]?

○ It creates a new key with the specified value

○ It raises a KeyError

○ It returns None

○ It does nothing

Problem 17: (2 pts)

How do you close a file in Python after opening it?

○ `close()`

○ `file.close()`

○ `fclose()`

○ `file.end()`

Problem 18: (2 pts)

What does it mean that memory is volitile storage?

○ Memory can be changed

○ The data in memory is fixed

○ When the computer is turned off, memory loses its content

○ When the computer is turned off, memory keeps its content

Problem 19: (2 pts)
How many integers can we represent with a binary string of length 6?

○ 32

○ 64

○ 80

○ 128

Problem 20: (2 pts)
What is an example of a positional representation system?

○ Roman Numerals

○ Tally Marks

○ Binary

○ All of the above

Problem 21: (2 pts)
If we multiply two n-bit numbers, what is the maximum number of bits required to store the product?

○ n

○ $n + 1$

○ $n + 2$

○ $2n$

Problem 22: (2 pts)
If we add two n-bit numbers, what is the maximum number of bits required to store the sum?

○ n

○ $n + 1$

○ $n + 2$

○ $2n$

Problem 23: (2 pts)
What type of circuit allows a feedback loop?

○ a combinational circuit

○ a sequential circuit

○ any circuit allows feedback loops

○ no circuit allows feedback loops

Problem 24: (2 pts)
What does it mean to cast a value?

○ create a new variable for the value

○ reassign the value of a variable

○ send the value back to the caller

○ change the datatype of the value

Problem 25: (2 pts)

Which of the following is not a valid variable name in Python?

○ `my_variable`

○ `123variable`

○ `variable_123`

○ `Variable`

Problem 26: (2 pts)

Which of the following is a valid way to create an empty list in Python?

○ `list.empty()`

○ `new_list = list()`

○ `new_list = []`

○ `list.create()`

Problem 27: (2 pts)

What is the purpose of the input() function in Python?

○ Prints a message to the console

○ Reads a file from disk

○ Takes user input from the console

○ Performs mathematical calculations

Problem 28: (2 pts)

What is the purpose of the range() function in Python?

○ Generates a list of numbers in a given range

○ Checks if a value is in a list

○ Returns the length of a list

○ Converts a string to uppercase

Problem 29: (2 pts)

True or False: The elements of a list are immutable.

○ True

○ False

Problem 30: (2 pts)

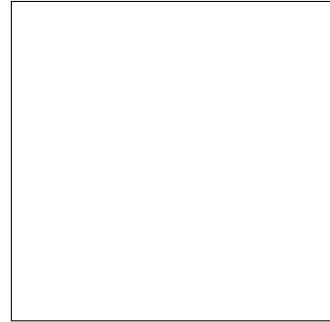How do you print multiple variables on the same line in Python?

○ `print(var1, var2)`

○ `print(var1 + var2)`

○ `print(var1 \n var2)`

○ `print(var1; var2)`

Problem 31: (5 pts)
  What is printed by the following Python code?

```
x = 5
y = x + 3
x = x - 1
z = 10
x = x + z
print(x, y, z)
```
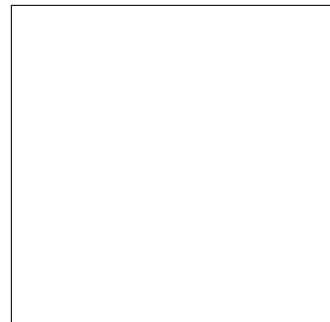
Answer:

Problem 32: (5 pts)
  What is printed by the Python code?

```
print(14//4, 14%4, 14.0/4)
```
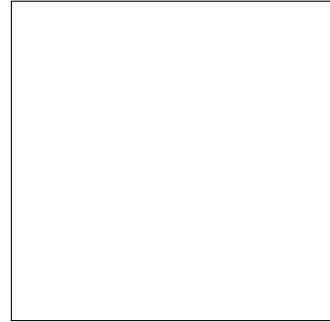
Answer:

Problem 33: (5 pts)
What is printed by the Python code?

```python
def f1():
    print('Hi')
def f2():
    print('Lo')

f1()
f2()
f1()
```
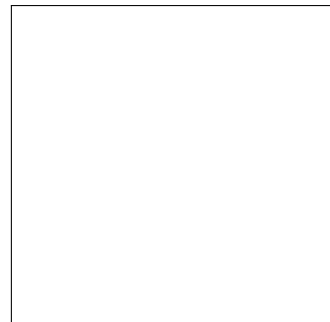
Answer:

Problem 34: (5 pts)
What is printed by the Python code?

```python
num = 30
if num > 20:
    print("do")
    if num < 15:
        print("go")
    print("no")
elif num < 0:
    print("lo")
    if num == 30:
        print("mo")
elif num // 3 == 10:
    print("so")
if num > 5:
    print("to")
```
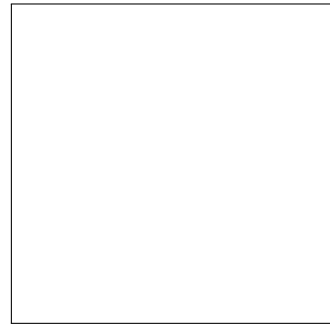
Answer:

Problem 35: (5 pts)

What is printed by the Python code?

```python
def foo(a, b):
    while b > 0:
        a += 1
        b -= 1
    print(a, b)
    return a
a = 7
b = 3
foo(b, a)
print(a, b)
```
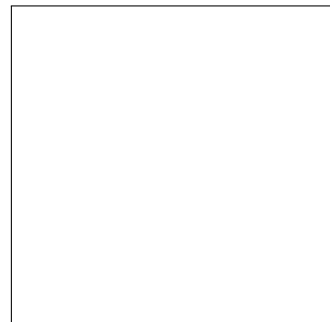
Answer:

Problem 36: (10 pts)

What is printed by the Python code?

```python
def func(n):
    if n == 1:
        return 2
    elif n == 2:
        return 3
    else:
        return func(n-1) * func(n-2)

print(func(4))
```

Answer:

Problem 37: (5 pts)

What is printed by the Python code?

```python
class Car:
    def __init__(self, make, model):
        self.make = make
        self.model = model

    def display_info(self):
        print(str(self.model) + ",", self.make")

my_car = Car("Honda", "CRV")
my_car.display_info()
```

Answer: