

# Midterm # 2

Started: Nov 1 at 5:09pm

## Quiz Instructions

Welcome to CS152 section 5 midterm #2 for fall 2022 semester. The midterm is completely online to be taken any time during 11/1/22. Submit by the end of the day, 11:59pm California time. No late submissions will be accepted. There is a time limit of 120 minutes on this exam. You must finish and submit in 120 minutes, once started. Use any resources available to you (computer, lecture slides, lecture videos, quiz reviews, search engines). Good luck!

### Question 1

1 pts

Your friend is throwing a dinner party and invited you. You are currently on a very strict diet and your friend wants to accommodate you. You provide a detailed recipe of a specific dish you can eat for her to prepare. Which paradigm this type of situation follows?

- ☐ Declarative
- ☒ Imperative
- ☐ Pointer instruction set
- ☐ Microarchitecture

### Question 2

1 pts

Your friend is throwing a dinner party and invited you. Your friend asks you what food you'd like to see at the party and you say "as long there are vegan options I will be alright". Which paradigm this type of situation follows?

- ☐ Imperative
- ☐ Microarchitecture
- ☒ Declarative

☐ Instruction set

### Question 3

1 pts

In your program you use control flow statements and loops. Which programming paradigm are you likely following?

☐ Specification

☐ Instruction set

☐ Monitoring

☒ Imperative

☐ Declarative

### Question 4

1 pts

Match these situations with appropriate paradigm each situation represents.

Your friend calls and asks you to pick them up, provides detailed instructions for how to get to the exact location where they are.

Imperative



Your friend calls and asks to pick them up, texts you the address for where they are.

Declarative



### Question 5

1 pts

You ordered a new table and it was delivered. There are step by step instructions in the box for how to put the table together. Which paradigm this type of situation follows?

- ☐ Engineering
- ☒ Imperative
- ☐ Declarative
- ☐ Toolset

**Question 6****1 pts**

You implement merge sort utilizing recursion. What type of problem solving approach are you using?

- ☒ Top-bottom approach
- ☐ Fixed solution approach
- ☐ Procedural
- ☐ Bottom-up approach

**Question 7****1 pts**

Object-oriented solutions tend to utilize which type of problem solving approach?

- ☐ Bottom-up approach
- ☒ Top-bottom approach
- ☐ Functional approach
- ☐ Modules approach

**Question 8****1 pts**

You are working on a program in which to arrive at a solution you are going to iteratively break a bigger problem into smaller problems, solve the sub-problems first, then integrate solutions of those sub-problems into a single comprehensive solution. Which problem solving approach are you utilizing?

- ☐ Bottom-up approach
- ☐ Top-bottom approach
- ☐ Modular design approach
- ☐ Technical specification approach

**Question 9****1 pts**

You are working on a program in which you are going to design representations of the objects used in your application, then you are going to implement interactions between these objects. Which problem solving approach are you utilizing?

- ☒ Bottom-up approach
- ☐ Prototype approach
- ☐ Top-bottom approach
- ☐ Recursive approach

**Question 10****1 pts**

Match these problem solving approaches.

System level view

Top-bottom approach



Parts-level view

Bottom-up approach



### Question 11

1 pts

Iterative implementation of merge sort is an example of what problem solving approach?

☒ Bottom-up approach

☐ Recursive approach

☐ Top-bottom approach

☐ Loop-based approach

### Question 12

1 pts

Is the following invocation for a function or a method?

***a.count\_down()***

☒ Method

☐ Function

### Question 13

1 pts

Is code reusability one of the advantages of using procedural programming?

☐ No☒ Yes**Question 14****1 pts**

What are the **core** principles of object oriented design?

☒ Abstraction☐ Tight coupling☒ Encapsulation☐ Object design☐ Security☐ Class design☒ Polymorphism☒ Inheritance**Question 15****1 pts**

Is the following invocation for a function or a method?

***sum\_of\_elements()***

☐ Method☒ Function**Question 16****1 pts**

In your program you want to represent a particular person Sam Jones. Which are you more likely to use?

- ☐ Class representing Sam Jones, then instantiate an object of that type
- ☒ Object of type Person carrying attributes of Sam Jones

**Question 17****1 pts**

Which do you aim to achieve in object oriented design?

- ☒ Loose coupling
- ☐ Tight coupling
- ☐ We do not design with coupling in mind

**Question 18****1 pts**

In Java, method overloading is an example of what?

- ☐ Nested classes
- ☒ Static polymorphism
- ☐ Loose coupling
- ☐ Procedural programming
- ☐ Dynamic polymorphism

**Question 19****1 pts**

When a method is overridden by a child class, can the method have a different return type than the parent's method?

- ☐ Yes
- ☐ Children cannot override parent's methods in Java
- ☒ No

### Question 20

1 pts

Inheritance allows us to define a new class in terms of another class.

- ☒ True
- ☐ False

### Question 21

2 pts

Match the terms to definitions for the SOLID design principles.

Single responsibility

Each class has a specialized ▾

Open-closed principle

Everything should be design ▾

Liskov substitution principle

Subclasses should add to p ▾

Interface segregation principle

The user of the class should ▾



Dependency inversion principle

Entities should depend on abstractions

## Question 22

1 pts

In my program I am using an object from which other objects will inherit. What type of object oriented language am I utilizing?

- ☐ Object based
- ☒ Prototype based
- ☐ Modular based
- ☐ Class based

## Question 23

1 pts

A process is a part of a thread.

- ☐ True
- ☒ False

## Question 24

1 pts

Which one consumes less resources?

- ☐ Process
- ☒ Thread

**Question 25****1 pts**

Which of these share the memory?

- ☒ Threads
- ☐ Processes

**Question 26****1 pts**

Outputting the result of the computation to standard output stream is considered a side effect in programming.

- ☒ True
- ☐ False

**Question 27****1 pts**

What is a pure function?

- ☐ A function with no input parameters
- ☐ A function with no return value
- ☒ A function with no side effects
- ☐ A function with no output to the user inside its body

**Question 28****1 pts**

Your function changed a value of a global variable inside its body. Can this function be considered pure?

☐ Yes

☒ No

**Question 29****1 pts**

Programming side effects are always there due to a mistake by a programmer.

☐ True

☒ False

**Question 30****1 pts**

In your program you are using facts, rules, and queries. What type of programming language are you using?

☐ Parallel

☐ Database

☒ Logic

☐ Functional

☐ Procedural

**Question 31****1 pts**

Which constraint programming language did we talk about in class?

- ☐ C
- ☒ Prolog
- ☐ Python
- ☐ Scheme

### Question 32

1 pts

Provide a line of code that creates a variable named ***my\_var*** and assigns value **"test"** to it in Python.

```
my_var="test"
```

### Question 33

1 pts

Is this code valid in Python?

```
alphabet_tuple = ('a', 'b', 'c', 'd', 'e')
```

```
alphabet_tuple[4] = 'f'
```

- ☒ No
- ☐ Yes

### Question 34

1 pts

Select the Python mutable data types we discussed in class (select all).

- ☒ Set
- ☐ String
- ☐ Numeric
- ☒ List
- ☐ Tuple
- ☒ Dictionary

### Question 35

1 pts

In your Python code you have the following list:

```
my_list = ["a", "b", "c", "d", "e", "f", "g", "h", "i"]
```

Provide a line of code that provide you with the following elements:

```
['c', 'd', 'e', 'f']
```

```
my_list[2:6]
```

### Question 36

1 pts

In your Python code you have the following lines of code:

```
my_list = [1,2,3,4,5,6,7]
```

```
my_list.append(8)
```

```
my_list[1] = 9
```

```
my_list[4] = 10
```

```
my_list.insert(3, 11)
```

```
print(my_list)
```

What is the output of this code?

### Question 37

1 pts

In your Python code you have the following lines of code:

```
my_data= (1, 3, "a", 10.3, [1, 2, 3, 4, ["a", "b", "c", "d"], 5, 6, 7, 8], 6, 1.5, "my  
string")
```

Provide a line of code that inserts value "e" into the most inner-list in the **2nd position**.

### Question 38

1 pts

In your Python code you have the following dictionary:

```
my_dict= {'a': 1,  
          'b': 2,  
          'c': 3,  
          'd': {1: 11,  
                2: 22,  
                3: 33,  
                4: {'my_key1': 10.2,  
                   'my_key2': {1: "sample text",  
                               2: "another sample text",  
                               3: "very important data",  
                               },  
                },  
          }
```

```

        'my_key3': 66
    }
}

```

Provide a line of code that accesses the **"very important data"** element in the most inner dictionary.

```
my_dict['d'][4]['my_key2'][3]
```

### Question 39

1 pts

In your Python code you have the following dictionary:

```

my_dict= {'a': 1,
          'b': 2,
          'c': 3,
          'd': {1: 11,
                2: 22,
                3: 33,
                4: {'my_key1': [1, 2, 3, 4, 5, 6, 7],
                    'my_key2': 3,
                    'my_key3': 66
                   }
               }
        }

```

Provide a line of code that updates the **6th** element in the list with **my\_key1** in most inner dictionary to the new value **99**.

```
my_dict['d'][4]['my_key1'][5]=99
```

### Question 40

1 pts

In your Python code you have the following variable:

***my\_string = "my important text goes here"***

Provide a line of code that accesses the 7th character from the end of the string.

```
my_string[-7]
```

### Question 41

1 pts

Is this code valid in Python?

***prefix = "year "***

***year = 2020***

***print(prefix + year)***

☒ No

☐ Yes

### Question 42

2 pts

Define a function called ***print\_by\_character()*** in Python, which accepts a string input parameter and, inside the function body, iterates over characters in that string and outputs/prints each letter on a new line by itself. This function does not return a value.

```
def print_by_character(input_string:str):  
    for c in input_string:
```



```
print(c)
```

p



9 words



### Question 43

2 pts

Define a function called ***sum\_elements()*** in Python, which accepts the following input parameters:

- a list of values
- a number indicating the starting position
- a number indicating the end position

In the body of the function implement code that will return a slice starting at the specified position and end at the specified position. Make sure to account for when the specified end position is greater than the size of the list.

```
from typing import List

def sum_elements(values:List[int], start:int, end:int):
    if end >= len(values):
        print("End Position is out of Bound!")
        return []
    return values[start: end+1]
```

p



29 words



## Question 44

2 pts

Define a function ***called add\_element()*** in Python, which will accept a dictionary and add new element to that dictionary. This function accepts the following input parameters:

- a dictionary
- a value corresponding to the new key (can be any data type)
- a value corresponding to the new value (can be any data type)

In the body of the function implement code that will take the passed in dictionary, add a new element specified by the other two input parameters, and return a dictionary with the new element added to it.

```
def add_element(dictionary, key, value ):
    dictionary[key] = value
    return dictionary
```

p



11 words

**Question 45****3 pts**

Define a function called `operate_on_set()` in Python, which will accept two sets and an operation (as a string) to perform on these two sets, and will return a set result of the operation. This function will accept the following input parameters:

- set #1
- set #2
- string value indicating the operation to perform on the sets (e.g. valid values can be "intersection", "union", "difference", "symdifference")

Inside the body of this function you will implement the logic that checks the value of the operation and, based on that value, compute the appropriate operation on the two sets. The result of this operation is returned from the function.

```
def operate_on_set(set1: Set, set2: Set, operation:str):  
    if operation == "intersection":  
        return set1.intersection(set2)  
    if operation == "union":  
        return set1.union(set2)  
    if operation == "difference":  
        return set1.difference(set2)  
    if operation == "symdifference":  
        return set1.symmetric_difference(set2)  
    print("Invalid Operation!")  
    return None
```

p



44 words



**Question 46****4 pts**

In Python, define a class called **Person**. Each person has the following instance attributes:

- name
- age

Each person also has the following class level attribute:

- species

The class **Person** should have the following functionality:

- constructor that initializes all the instance attributes
- getters for all the instance level attributes
- setters for all the instance level attributes

Define a class called **Artist**, which inherits from class **Person**. Each artist should have the following instance level attribute:

- specialty

The class Artist should have the following functionality:

- constructor that initializes all the instance level attributes
- getter for its instance level attribute
- setter for its instance level attribute

Add code that instantiates an instance of Artist with the following information: Sam Smith, 29, sculpture.

Print out information about this artist (formatting is up to you).

Change the name of this artist to Samuel Smith.

Print out information about this artist again (formatting is up to you).

```
def set_specialty(self, new_specialty):
```

```
    self.specialty = new_specialty
```

```
self.specialty = new_specialty
```

```
def __str__(self):  
    return "{} is the name. {} is the age. {} is the specialty".format(self.name,  
self.age, self.specialty)  
  
sam_smith = Artist("Sam Smith", 29, "sculpture")  
print(sam_smith)  
  
sam_smith.set_name("Samuel Smith")  
print(sam_smith)
```

p



95 words



## Question 47

3 pts

Define the following predicates in Prolog:

***Samantha is a mother of John***

***Samantha is a mother of Teresa***

***Mary is a mother of Samantha***

***Mary is a mother of Luisa***

***Terry is a father of John***

***Terry is a father of Teresa***

***Jose is a father of Samantha***

***Jose is a father of Luisa***

***Samantha is a female***

***Teresa is a female***

***Luisa is a female***

***Mary is a female***

***Terry is a male***

***Jose is a male***

**John is a male**

In your program, create a **rule** that defines an **aunt**. This rule can be based on other rules you create or you can write it as a single rule. At the end write a **query** that asks for all the aunts of **Teresa**.

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```
mother_of("Teresa", "Samantha").
```

```
mother_of("Samantha", "Mary").
```

```
mother_of("Luisa", "Mary").
```

```
father_of("John", "Terry").
```

```
father_of("Teresa", "Terry").
```

```
mother_of("Teresa", "Samantha").
```

```
mother_of("Samantha", "Mary").
```

```
mother_of("Luisa", "Mary").
```

p



27 words

**Question 48**

2 pts

Define the following predicates in Prolog:

**Martha likes pasta**

**Martha likes hiking**

**Martha likes drawing**

**Mike likes pasta**

***Mike likes running***

***Mike likes drawing***

***pasta is food***

***hiking is activity***

***drawing is activity***

***running is activity***

Create a rule that will produce all the things both Mike and Martha like to do (activities only).

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