

Beijing National Day School
Department of Mathematics

AP Computer Science Principles
Semester 1 Exam

English Name: _____

Pinyin Name: _____

Mr. Alwin Tareen, January 2019

Exam Record

MultipleChoice _____ / 50 pts

PythonSA _____ / 30 pts

InternetSA _____ / 20 pts

Total: _____ / 100 pts

Grade: _____

Part I: Python Programming and the Internet, Multiple Choice (50 points)

- Number of Python programming questions: 30. Percent of total grade: 30%.
- Determine the answer to each of the following questions, using the available space for any necessary scratchwork.
- Decide which is the best of the choices given, and select the correct answer by filling in the corresponding bubble on the separate answer sheet.

- (1^{pt}) 1. Which of the following choices is a legal and legitimate Python variable name?
- A 2bad4you
 B calvin&hobbes
 C year2000
 D #hammertime
- (1^{pt}) 2. Which of the following choices is the correct assignment statement for a string data type?
- A greetings = [Hello]
 B greetings = @Hello@
 C greetings = "Hello"
 D greetings = #Hello#
- (1^{pt}) 3. What are the only values that are permissible in Python's boolean data type?
- A Yes, No
 B On, Off
 C Right, Wrong
 D True, False
- (1^{pt}) 4. Which of the following is a comment in Python?
- A /* This is a test */
 B // This is a test
 C # This is a test
 D % This is a test
- (1^{pt}) 5. What does the Python function input() do?
- A Pause the program and read data from the user.
 B Take a screen shot from an area of the screen.
 C Read the memory of the running program.
 D Connect to the network and retrieve a web page.
- (1^{pt}) 6. Which Python keyword indicates the start of a function definition?
- A sweet
 B def
 C continue
 D return

6 pts

- (1^{pt}) 7. Consider the following function definition:
- ```
def circlearea(radius):
```
- In this context, what is the formal name for the variable `radius`?
- A expression  
 B logical deduction  
 C parameter  
 D condition
- (1<sup>pt</sup>) 8. Which of the following is NOT a valid string method in Python?
- A `boldface()`  
 B `startswith()`  
 C `upper()`  
 D `strip()`
- (1<sup>pt</sup>) 9. What does the following Python program print out?
- ```
str1 = "Hello"  
str2 = "there"  
greet = str1 + str2  
print(greet)
```
- A Hello there
 B Hellothere
 C there
 D Hello
- (1^{pt}) 10. How would you use the index operator to print out the letter "q" from the following string?
- ```
x = "From marquard@uct.ac.za"
```
- A `print(x[9])`  
 B `print(x[8])`  
 C `print(x[-1])`  
 D `print(x[q])`
- (1<sup>pt</sup>) 11. How would you use string slicing to print out "uct" from the following string?
- ```
x = "From marquard@uct.ac.za"
```
- A `print(x[14+17])`
 B `print(x[15:18])`
 C `print(x[14:17])`
 D `print(x[14:3])`
- (1^{pt}) 12. How would you print out the following string in all upper case in Python?
- ```
greet = "Hello there"
```
- A `puts greet.ucase;`  
 B `print(uc($greet))`  
 C `print(greet.upper())`  
 D `console.log(greet.toUpperCase());`

(1<sup>pt</sup>) 13. What is the iteration variable in the following Python code?

```
for letter in "banana":
 print(letter)
```

- A letter
- B print
- C in
- D "banana"

1 pt

(1<sup>pt</sup>) 14. What does the following Python program print out?

```
data = "From stephen.marquard@uct.ac.za"
pos = data.find(".")
print(data[pos:pos+3])
```

- A uct
- B mar
- C .ma
- D ste

1 pt

(1<sup>pt</sup>) 15. Consider the following string declaration:

```
grocery = "Mango"
```

Which of the following statements would cause an error(also known as a traceback)?

- A dance = "T" + grocery[1:]
- B person = grocery[:-2]
- C several = grocery \* 3
- D grocery[0] = "T"

1 pt

(1<sup>pt</sup>) 16. Consider the following Python code:

```
lunch = "pizza"
dinner = lunch[:]
```

Note that the **start** and **stop** indexes are omitted from the square bracket notation. What is the technical term for the outcome of this kind of string slicing?

- A concatenation
- B immutable
- C clone
- D iteration

1 pt

(1<sup>pt</sup>) 17. For the following list, how would you print out "Sally"?

```
friends = ["Joseph", "Glenn", "Sally"]
```

- A print friends[3]
- B print friends['Sally']
- C print friends[2]
- D print friends[2:1]

1 pt

5 pts

(1<sup>pt</sup>) 18. Which of the following Python statements would print out the length of a list stored in the variable `fruit`?

- A `print length(fruit)`
- B `print fruit.length()`
- C `print len(fruit)`
- D `print strlen(fruit)`

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| 1 pt |

(1<sup>pt</sup>) 19. What type of data is produced when you call the `range()` function? For example, consider the statement: `nums = range(5)`

- A A list of characters
- B A list of integers
- C A list of words
- D A string

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(1<sup>pt</sup>) 20. What does the following Python code print out?

```
first = [1, 2, 3]
second = [4, 5, 6]
nums = first + second
print len(nums)
```

- A [1, 2, 3]
- B [1, 2, 3, 4, 5, 6]
- C [4, 5, 6]
- D 6

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| 1 pt |

(1<sup>pt</sup>) 21. Which of the following slicing operations will produce the list [12, 3]?

```
nums = [9, 41, 12, 3, 74, 15]
```

- A `nums[1:3]`
- B `nums[2:4]`
- C `nums[2:2]`
- D `nums[12:3]`

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(1<sup>pt</sup>) 22. What will the following Python code print out?

```
friends = ["Joseph", "Glenn", "Sally"]
friends.sort()
print friends[0]
```

- A Glenn
- B Joseph
- C friends
- D Sally

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| 5 pts |

(1<sup>pt</sup>) **23.** Which list method adds a new item to the end of an existing list?

- A add()
- B append()
- C index()
- D push()

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(1<sup>pt</sup>) **24.** Which of the following Python functions deletes an element from a list?

- A push()
- B pop()
- C invalidate()
- D split()

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(1<sup>pt</sup>) **25.** Which of the following Python functions breaks a string into a list of words?

- A split()
- B join()
- C remove()
- D extend()

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(1<sup>pt</sup>) **26.** What task does the following Python code perform?

```
for num in range(1, 10, 2):
 print(num)
```

- A It prints all the ODD numbers in the range [1, 9]
- B It prints all numbers in the range[1, 9]
- C This code fails with a traceback.
- D It prints all the EVEN numbers in the range [1, 10]

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(1<sup>pt</sup>) **27.** What is the purpose of the second parameter of the `get()` method for Python dictionaries?

- A It signifies a key which must be placed in the dictionary.
- B It specifies a unique key that the programmer wishes to retrieve.
- C It indicates the particular value that the programmer wants to retrieve.
- D To provide a default value if the key(from the first parameter of the `get()` method) does not exist in the dictionary.

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(1<sup>pt</sup>) **28.** How are Python dictionaries different from Python lists?

- A Python lists can store multiple values, whereas Python dictionaries store a single value.
- B Python lists can store strings, while Python dictionaries can only store words.
- C Python lists are indexed using integers, whereas Python dictionaries are indexed with any immutable data type.
- D Python dictionaries are mutable, while Python lists are immutable.

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| 6 pts |

(1<sup>pt</sup>) **29.** What would be the output produced by the following Python code?

```
fruit = {"banana":5, "pear":3, "orange":8}
result = fruit["kiwi"]
print(result)
```

- A 0
- B This program would fail with a traceback.
- C kiwi
- D -1

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(1<sup>pt</sup>) **30.** What would be the output produced by the following Python code?

```
fruit = {"banana":5, "pear":3, "orange":8}
result = fruit.get("kiwi", 0)
print(result)
```

- A 0
- B This program would fail with a traceback.
- C kiwi
- D -1

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| 2 pts |

**The Internet, Multiple Choice**

- Number of Internet questions: 20. Percent of total grade: 20%.
- Determine the answer to each of the following questions, using the available space for any necessary scratchwork.
- Decide which is the best of the choices given, and select the correct answer by filling in the corresponding bubble on the separate answer sheet.

(1<sup>pt</sup>) **31.** Which of the following best explains what happens when a new device is connected to the Internet?

- A** A device driver is assigned to the device.
- B** An Internet Protocol(IP) address is assigned to the device.
- C** A packet number is assigned to the device.
- D** A Web site is assigned to the device.

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(1<sup>pt</sup>) **32.** Which of the following activities poses the greatest cybersecurity risk?

- A** Making a purchase at an online store that uses Public-key encryption to transmit the credit card information.
- B** Paying a bill using a secure electronic payment system.
- C** Reserving a hotel room by emailing a credit card number to a hotel.
- D** Withdrawing money from a bank account using an automated teller machine(ATM).

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(1<sup>pt</sup>) **33.** Which of the following is LEAST likely to indicate a phishing attack?

- A** An email from your bank, asking you to call the telephone number on the back of your credit card, to verify a recent transaction.
- B** An email from a merchant, asking you to click on a link, to reset your password.
- C** An email from a public utility company, asking you to enter your date of birth and social security number for verification purposes.
- D** An email from an unknown sender, saying that you are the recipient of a large sum of money, and that they need your bank account number for the successful transfer of these funds.

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(1<sup>pt</sup>) **34.** Roughly how many unique Internet Protocol(IP) addresses are available under the IPv4 protocol?

- A** 32 billion
- B** 4.3 billion
- C** 128 billion
- D** 255 billion

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| 1 pt |

(1<sup>pt</sup>) **35.** The latency of a network connection is most appropriately measured with which of the following units?

- A** Bits per byte
- B** Bits per second
- C** Bytes
- D** Milliseconds

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| 5 pts |



(1<sup>pt</sup>) **36.** An Internet Service Provider(ISP) is considering an update to its servers that would save copies of the Web pages most frequently visited by each user. Which of the following is LEAST likely to occur as a result of the update?

1 pt

- A** Average response time for user requests might decrease.
- B** The privacy of the users might be negatively affected.
- C** Storage requirements for the servers might increase.
- D** Web sites that are not visited frequently might no longer be accessible to users.

(1<sup>pt</sup>) **37.** Which of the following is a characteristic of the fault-tolerant nature of routing on the Internet?

1 pt

- A** The ability to use a hierarchical naming system, to avoid naming conflicts.
- B** The ability to provide data transmission, even when some connections have failed.
- C** The ability to resolve errors in Domain Name System(DNS) lookups.
- D** The ability to use multiple protocols, such as HyperText Transfer Protocol(HTTP), Internet Protocol(IP), and Simple Mail Transfer Protocol(SMTP) to transfer data.

(1<sup>pt</sup>) **38.** Two computers are built by different manufacturers. One is running a Web server, and the other is running a Web browser. Which of the following best describes the ability of the two computers to communicate with each other across the Internet?

1 pt

- A** The computers cannot communicate, because different manufacturers use different communication protocols.
- B** The computers can communicate, but additional hardware is needed, to convert data packets from one computer's protocol to the other computer's protocol.
- C** The computers can communicate directly, only if the message consists of text. Other formats cannot be interpreted across computers.
- D** The computers can communicate directly, because Internet communication uses standard protocols.

(1<sup>pt</sup>) **39.** Which of the following best describes a Distributed Denial of Service(DDoS) attack?

1 pt

- A** An attempt by a country to deny its citizens access to the Internet.
- B** An attempt to deny users access to a Web site's resources, by flooding the Web site with requests from multiple systems.
- C** An attempt by one user to deny service to another user, by posting material on a social network.
- D** An attempt by a user of the Internet to get private information from a secure database.

(1<sup>pt</sup>) **40.** Which of the following best describes the role of the Internet Engineering Task Force(IETF)?

1 pt

- A** Developing standards and protocols for Internet communication.
- B** Preventing copyrighted materials from being illegally distributed online.
- C** Preventing malicious software from being distributed online.
- D** Verifying the ownership of encrypted keys used in secured messages.

5 pts

- (1<sup>pt</sup>) **41.** A bank customer receives an email from a sender, claiming to be a bank employee. The email asks the customer to provide personal information, and to call a phone number, if they have any questions. The customer suspects that the email might be a phishing attempt. Which of the following responses is most likely to be a privacy risk for the bank customer?
- A** Calling the bank at its official phone number, to ask whether the request for personal information is legitimate.
- B** Calling the phone number given in the email, and providing the personal information over the phone.
- C** Checking that the domain name of the sender's email address is associated with the bank.
- D** Conducting a Web search to see if other people have received similar requests for personal information.
- (1<sup>pt</sup>) **42.** Which of the following is a true statement about Internet communication?
- A** Devices from different manufacturers are required to run the same operating system to communicate over the Internet.
- B** Every device connected to the Internet is assigned a digital certificate by a certificate authority.
- C** Every device connected to the Internet is assigned an Internet Protocol(IP) address.
- D** Every device connected to the Internet requires a high-bandwidth connection.
- (1<sup>pt</sup>) **43.** Which of the following allows users to refer to Web sites using names, such as `example.com`, rather than the numerical IP address, such as `93.184.216.34`?
- A** A digital certificate
- B** The domain name system(DNS)
- C** The hypertext transfer protocol(HTTP)
- D** The simple mail transfer protocol(SMTP)
- (1<sup>pt</sup>) **44.** Which of the following explains a benefit of using open standards and protocols for Internet communication?
- A** Open standards and protocols allow different manufacturers and developers to build hardware and software that can communicate with hardware and software on the rest of the network.
- B** Open standards and protocols provide ways for users to eliminate the latency of the messages that they send on the Internet.
- C** Open standards and protocols allow users to freely share or reuse material found on the Internet for noncommercial purposes.
- D** Open standards and protocols prevent developers from releasing software that contains errors.
- (1<sup>pt</sup>) **45.** In public key cryptography, the sender uses the recipient's public key to encrypt a message. Which of the following is needed to decrypt the message?
- A** The sender's public key.
- B** The sender's private key.
- C** The recipient's public key.
- D** The recipient's private key.

1 pt

1 pt

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1 pt

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5 pts

- (1<sup>pt</sup>) **46.** Which of the following describes how a distributed denial-of-service(DDoS) attack is most likely to compromise an online store’s Web site?
- A By causing incorrect information about services to be displayed.
- B By making it difficult for the site to safeguard customer login information.
- C By preventing customers from placing orders.
- D By preventing the store from filling previously placed orders.
- (1<sup>pt</sup>) **47.** In the process of digging a trench, a landscaping company cuts a networking optic fiber line. Transmission of Internet traffic is still possible, however, through additional pathways that provide alternate routes between transmitter and receiver. These additional pathways describe a concept referred to as:
- A bandwidth
- B hierarchy
- C latency
- D redundancy
- (1<sup>pt</sup>) **48.** One day, you receive an email from someone you don’t recognize. Upon opening the email, you discover, to your great surprise, that you have been carefully selected by a Nigerian Prince to be the recipient of US\$550 million in surplus oil revenues. In order to facilitate the transfer of funds, you simply have to reply to the email with your name, address, and bank account number. Which of the following choices best describes this type of cyber threat?
- A Phishing
- B Distributed denial of service attack
- C Virus/malware
- D Man-in-the-middle attack
- (1<sup>pt</sup>) **49.** When building Internet networks, it is important to consider redundancy. Which of the following is an example of redundancy?
- A Optimizing the system, so that a single request has the shortest time duration between transmitting and receiving.
- B Optimizing the system, so that as much data as possible can be transferred, in a certain amount of time.
- C The hierarchical nature of the Internet allows for massive growth.
- D Ensuring that if any single node in the network were to fail, then data packets could still be transmitted successfully.
- (1<sup>pt</sup>) **50.** HTTP is an acronym for HyperText Transfer Protocol. Of the following choices, which one is the best definition of HTTP?
- A HTTP is a protocol used to create and implement web pages.
- B HTTP is the protocol for translating a web page’s address to an Internet Protocol address.
- C HTTP is the protocol for communicating with web servers, and transferring web pages and other data back to a browser.
- D HTTP is the address most people use to access a web page.

1 pt

1 pt

1 pt

1 pt

1 pt

5 pts

**Part II: Python Programming, Short Answer (30 points)**

- Number of questions: 30. Percent of total grade: 30%.
- Solve each of the following short answer questions. Write your solution in the corresponding box labelled, “Answer:”.

|                    |                                                                                                                                                                                                                                       |                                                                                                                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1 <sup>pt</sup> ) | <b>1.</b> What is the output of the following Python code:<br><pre>print(3 &gt; 4 or (2 &lt; 3 and 9 &gt; 10))</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                                | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>2.</b> What is the output of the following Python code:<br><pre>lunch = "cheeseburgers"<br/>print(lunch[6:12])</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                             | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>3.</b> What is the output of the following Python code:<br><pre>breakfast = "pineapple"<br/>print(breakfast[:4])</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                           | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>4.</b> What is the output of the following Python code:<br><pre>flavor = "strawberry"<br/>print(flavor[5:])</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                                | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>5.</b> What is the output of the following Python code:<br><pre>icecream = "vanilla"<br/>print(icecream[:])</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                                | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>6.</b> What is the output of the following Python code:<br><pre>drink = "soda"<br/>print(drink[:-1])</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                                       | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>7.</b> What is the output of the following Python code:<br><pre>beverage = "water"<br/>print(beverage * 3)</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div>                                                 | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |
| (1 <sup>pt</sup> ) | <b>8.</b> What is the output of the following Python code:<br><pre>greetings = "Hello, world!"<br/>newgreetings = "J" + greetings[1:]<br/>print(newgreetings)</pre> <div style="border: 1px solid black; padding: 2px;">Answer:</div> | <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; text-align: center; margin: 0 auto;">1 pt</div> |

8 pts

(1<sup>pt</sup>) 9. What is the output of the following Python code:

```
print("cola" in "chocolate")
```

Answer:

1 pt

(1<sup>pt</sup>) 10. What is the output of the following Python code:

```
print("seed" in "banana")
```

Answer:

1 pt

(1<sup>pt</sup>) 11. What is the output of the following Python code:

```
fruit = "kiwi"
bigfruit = fruit.upper()
print(bigfruit)
```

Answer:

1 pt

(1<sup>pt</sup>) 12. What is the output of the following Python code:

```
citrus = "ORANGE"
smallcitrus = citrus.lower()
print(smallcitrus)
```

Answer:

1 pt

(1<sup>pt</sup>) 13. What is the output of the following Python code:

```
vegetable = "cauliflower"
index = vegetable.find("u")
print(index)
```

Answer:

1 pt

(1<sup>pt</sup>) 14. What is the output of the following Python code:

```
line = "Please have a nice day"
print(line.startswith("Please"))
```

Answer:

1 pt

(1<sup>pt</sup>) 15. What is the output of the following Python code:

```
meal = "fresh pizza is the best pizza"
print(meal.replace("pizza", "salad"))
```

Answer:

1 pt

(1<sup>pt</sup>) 16. What is the output of the following Python code:

```
def choose(x, y, z):
 if x:
 return y
 else:
 return z
print(choose(False, 2, 3))
```

Answer:

1 pt

8 pts

- (1<sup>pt</sup>) 17. What is the output of the following code:  
`cheeses = ["Cheddar", "Edam", "Gouda"]  
print(cheeses[0])`  
Answer:
- (1<sup>pt</sup>) 18. What is the output of the following code:  
`print([0] * 4)`  
Answer:
- (1<sup>pt</sup>) 19. What is the output of the following code:  
`snacks = ["pizza", "burger"]  
snacks.append("fries")  
print(snacks)`  
Answer:
- (1<sup>pt</sup>) 20. What is the output of the following code:  
`drinks = ["tea", "soda", "cola", "juice"]  
drinks.sort()  
print(drinks)`  
Answer:
- (1<sup>pt</sup>) 21. What is the output of the following code:  
`dinner = ["salad", "bread", "steak", "potato"]  
del dinner[1]  
print(dinner)`  
Answer:
- (1<sup>pt</sup>) 22. What is the output of the following code:  
`nums = [3, 41, 12, 9, 74, 15]  
print(max(nums))`  
Answer:
- (1<sup>pt</sup>) 23. What is the output of the following code:  
`food = {"pizza":3}  
food["fries"] = 10  
print(food)`  
Answer:
- (1<sup>pt</sup>) 24. What is the output of the following code:  
`treasure = {"gold":50, "silver":100}  
print("gold" in treasure)`  
Answer:

(1<sup>pt</sup>) 25. What is the output of the following code:

```
inventory = {
 "pocket": "lint",
 "canteen": "water",
 "pouch": "flint",
 "backpack": ["shovel", "bedroll", "rope"]
}
print(inventory["backpack"])
```

Answer:

1 pt

(1<sup>pt</sup>) 26. What is the output of the following code:

```
fortune = {"gold": 500}
fortune["gold"] += 50
print(fortune)
```

Answer:

1 pt

(1<sup>pt</sup>) 27. What is the output of the following code:

```
inventory = {
 "gold": 500,
 "backpack": ["xylophone", "dagger", "bedroll"]
}
inventory["backpack"].sort()
print(inventory["backpack"])
```

Answer:

1 pt

(1<sup>pt</sup>) 28. What is the output of the following code:

```
grocery = {"kiwi": 5, "grape": 12}
del grocery["kiwi"]
print(grocery)
```

Answer:

1 pt

(1<sup>pt</sup>) 29. Consider the following dictionary:

```
salad = {"caesar": 1, "garden": 2}
```

Write an assignment statement that modifies this dictionary to become the following:

```
salad = {"caesar": 1, "vegetable": 3, "garden": 2}
```

Answer:

1 pt

(1<sup>pt</sup>) 30. What is the output of the following code:

```
singer = {"justin": "bieber", "taylor": "swift", "ed": "sheeran"}
print(singer.get("swift", "guitar"))
```

Answer:

1 pt

6 pts

**Part III: The Internet, Short Answer** (20 points)

- Number of questions: 6. Percent of total grade: 20%.
- Solve each of the following short answer questions. Write your solutions in the space provided.

**Network Concepts**

(6<sup>pts</sup>) 1. In general, the Internet is a system of interconnected networks based on open standards and protocols(rules). For each of the following, explain the specific functionality that is provided to the infrastructure of the Internet.

|       |
|-------|
|       |
| 6 pts |

(a) (1 pt) Transmission Control Protocol(TCP)

(b) (1 pt) Internet Protocol(IP)

(c) (1 pt) Dynamic Host Configuration Protocol(DHCP)

|       |
|-------|
|       |
| 3 pts |



(d) (1 pt) Domain Name System(DNS)

(e) (1 pt) The Internet Engineering Task Force(IETF)

(f) (1 pt) The Routing Model

(3<sup>pts</sup>) **2.** Consider the following IPv4 addresses.

(a) (1 pt) 23.75.345.200

- Is this a legitimate IPv4 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

|       |
|-------|
|       |
| 3 pts |

(b) (1 pt) 119.75.217.26

- Is this a legitimate IPv4 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

(c) (1 pt) 171.64.219.70

- Is this a legitimate IPv4 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

(3<sup>pts</sup>) **3.** Consider the following IPv6 addresses.

(a) (1 pt) 2001:4860:4860::8888

- Is this a legitimate IPv6 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

|       |
|-------|
|       |
| 3 pts |

(b) (1 pt) 28aa:0018:a5b2:df7b

- Is this a legitimate IPv6 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

(c) (1 pt) 2011:ed04:3a1b:12fe:3001:110b:abaa:001f

- Is this a legitimate IPv6 address? (Circle one) YES NO
- If you answered, "NO," explain why this is the case.

|       |
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|       |
| 6 pts |

**Cybersecurity**

- (3<sup>pts</sup>) 4. Cybersecurity refers to systems and practices that users can employ to better protect themselves against cyber threats. Describe each of the following cyber threats, and provide suitable examples where necessary.

|       |
|-------|
|       |
| 3 pts |

(a) (1 pt) Phishing

(b) (1 pt) Viruses/malware

(c) (1 pt) Distributed Denial of Service(DDoS)

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|       |
| 3 pts |

**Cryptography**

(3pts)

**5.**

|       |
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|       |
| 3 pts |

Anna has to send an email to Bob containing confidential information. Bob and Anna have never sent emails to each other before.

Bob and Anna both have public and private keys.

The first step is for Anna to request that Bob sends her one of his keys.

**(i)** State the key that Bob sends. ....[1]

Anna has received the key from Bob.

The following incomplete table shows the sequence of actions between Anna and Bob to communicate the confidential information.

Complete the table.

| The person performing the action | What that person does                               |
|----------------------------------|-----------------------------------------------------|
| Anna                             | Requests Bob's <answer to <b>part (c)(i)</b> > key. |
| Bob                              | .....                                               |
| Anna                             | .....                                               |
| Anna                             | Sends the email to Bob.                             |
| Bob                              | .....<br>.....                                      |

|       |
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|       |
| 3 pts |

- (2<sup>pts</sup>) **6.** Consider the following series of numerical ASCII values, which represents a piece of ciphertext. The plaintext message was encoded with a Caesar Cipher, using a key shift value of 10. Then, the resulting ciphertext letters were individually translated into numerical ASCII values, to give the following:

- 113 107 98 110 111 120 99 107 118 107 110

Use the following ASCII table to decode this ciphertext, and reveal the delicious message within.

|        |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| value  | 97  | 98  | 99  | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |
| letter | a   | b   | c   | d   | e   | f   | g   | h   | i   | j   | k   | l   | m   |
| value  | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 |
| letter | n   | o   | p   | q   | r   | s   | t   | u   | v   | w   | x   | y   | z   |

2 pts

2 pts

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|       |
|-------|
|       |
| 0 pts |