

## Exam1 (MW) - Results

X

### Attempt 1 of 1

Written Oct 1, 2025 9:59 AM - Oct 1, 2025 11:12 AM

Attempt Score: 75 / 100 - 75 %

Overall Grade (Highest Attempt) 75 / 100 - 75 %

#### Question 1

2 / 2 points

Consider the following Python script:

```
numbers = [1, 2, 3, 4, 5, 6]
f_res = filter(lambda x: x % 2 == 1, numbers)
m_res = map(lambda x: x + 1, f_res)
res = list(m_res)
```

Which of the following is NOT in res?

- 1
- 2
- 4
- 6

#### Question 2

2 / 2 points

Which of the following is NOT a valid JSON value?

- [{}]
- [{}:]
- [true, false]
- ("25": "age")

#### Question 3

2 / 2 points

Which of the following HTTP methods used in Firebase REST API will generate a random key in the database?

- GET
- PUT
- POST
- PATCH

#### Question 4

0 / 2 points

What is the smallest unit for the erase operations in an SSD?

- bit
- byte
- page
- block

#### Question 5

2 / 2 points

Which of the following is most likely a block size in SSD?

- 4B
- 256B
- 4MB
- 4GB

#### Question 6

2 / 2 points

Which of the following bytes is a continuation byte in UTF-8 encoding?

- 1100 0000
- 1000 0000
- 0100 0000
- 1110 0000

#### Question 7

0 / 2 points

How many bytes are needed to encode the euro symbol (its code point is 20ad) using UTF-8?

- 1
- 2
- 3
- 4

#### Question 8

2 / 2 points

How long does a full rotation take for an HDD with 10000 RPM?

- 1ms
- 2ms
- 3ms
- 6ms

#### Question 9

2 / 2 points

What is the average seek time for an HDD whose max seek time is 9ms?

- 1ms
- 3ms
- 4.5ms
- 5ms

#### Question 10

2 / 2 points

Which of the following is NOT among the 3Vs we talked about in class?

- Volume
- Velocity
- Variety
- Veracity

#### Question 11

2 / 2 points

Which of the following is most likely the read latency in SSD?

- 10 nanoseconds
- 20 microseconds
- 2500 microseconds
- 10 milliseconds

#### Question 12

2 / 2 points

What is the default block size in HDFS?

- 4KB
- 4MB
- 128KB
- 128MB

#### Question 13

0 / 2 points

How many replicas are there for each block in HDFS if the replication factor is 2?

- 1
- 2
- 3
- 4

#### Question 14

2 / 2 points

Consider writing a block in HDFS. Suppose the packet size is 128KB. How many packets will the HDFS block be divided into?

- 1024
- 2000
- 2048
- None of above

#### Question 15

2 / 2 points

Which of the following is NOT among the reasons why HDFS has a very large block size?

- HDFS has less metadata to maintain
- Reading of content of a block can be done fast
- A large amount of data can be sequentially placed on storage
- Storage space is very expensive

#### Question 16

2 / 2 points

Which timestamp of a file will be changed by the chmod command?

- Access time
- Modification time
- Change time
- None of above

#### Question 17

0 / 2 points

In SSD, what does P mean in P/E cycle?

- Program
- Procedure
- Production
- Page

#### Question 18

2 / 2 points

What is NOT stored in the inode for a file in a file system?

- File size
- Permissions
- Number of blocks allocated
- Content of the file

#### Question 19

2 / 2 points

For which of the following "hdfs dfs" commands, a client needs to talk to both NameNode and DataNode?

- mkdir
- ls
- cat
- None of above

#### Question 20

2 / 2 points

Which of the following RPC methods will be executed by DataNode?

- create()
- append()
- addBlock()
- readBlock()

#### Storage system, 15 Points

Consider an HDD with the following characteristics:

- Average seek time = 7ms
- Average rotational latency = 3ms
- Maximum bandwidth = 100MB/s
- Block size = KB

Suppose an application wants to read 1024 blocks from the HDD.

#### 1) [11 points]

Suppose all the blocks are sequentially laid out on the same track.

#### Question 21

1 / 1 point

What is the total size of data to be transmitted?

$$1024 \times 4 \text{ KB} = 4096 \text{ KB} = 4 \text{ MB}$$

The correct answer is not displayed for Written Response type questions.

#### Question 22

3 / 3 points

Give an estimate on how long the application needs to wait for the device to start transmitting the data. Explain your answer.

10ms.

Rotational Latency (3ms) + Average Seek Time (7ms) = 10ms.

After 10ms, the transmission starts.

The correct answer is not displayed for Written Response type questions.

#### Question 23

2 / 2 points

How much time will the device spend in transmitting the data? Show your derivation.

$$4 \text{ MB} / (100 \text{ MB/s}) = 0.04 \text{ s} = 40 \text{ ms}$$

The correct answer is not displayed for Written Response type questions.

#### Question 24

1 / 1 point

What is the completion time of this workload?

$$3\text{ms} + 7\text{ms} + 40\text{ms} = 50\text{ms}$$

The correct answer is not displayed for Written Response type questions.

#### Question 25

2 / 2 points

Which of the following is most likely the read latency in SSD?

- 10 nanoseconds
- 20 microseconds
- 2500 microseconds
- 10 milliseconds

#### Question 26

2 / 2 points

How many bytes are needed to encode the euro symbol (its code point is 20ad) using UTF-8?

- 1
- 2
- 3
- 4

#### Question 27

1 / 2 points

How long does a full rotation take for an HDD with 10000 RPM?

- 1ms
- 2ms
- 3ms
- 6ms

#### Question 28

2 / 2 points

What is the average seek time for an HDD whose max seek time is 9ms?

- 1ms
- 3ms
- 4.5ms
- 5ms

#### Question 29

2 / 2 points

What is the average rotational latency for an HDD whose max rotational latency is 3ms?

- 1ms
- 2ms
- 3ms
- 6ms

#### Question 30

2 / 2 points

What is the average seek time for an HDD whose max seek time is 7ms?

- 1ms
- 2ms
- 3ms
- 7ms

#### Question 31

2 / 2 points

What is the average rotational latency for an HDD whose max rotational latency is 3ms?