Question 1

1 / 1 point

Given are the running times of some algorithms. Please select all the **efficient** algorithm running times.

□ $$O(2^n)$$

☑ $$O(n^2)$$

☑ $$O(n \log n)$$

□ $$O(n!)$$

Question 2

1 / 1 point

Let's consider a box packing problem discussed in class: 12 boxes of capacities {10, 32, 7, 10, 16, 21, 20, 73, 42, 49, 31, 30} and 14 items of sizes {21, 24, 1, 91, 27, 43, 29, 10, 33, 29, 33, 29, 23, 68}. Please select the maximum number of items that can be placed in the boxes.

○ 7

Question 2

1 / 1 point

Let's consider a box packing problem discussed in class: 12 boxes of capacities {10, 32, 7, 10, 16, 21, 20, 73, 42, 49, 31, 30} and 14 items of sizes {21, 24, 1, 91, 27, 43, 29, 10, 33, 29, 33, 29, 23, 68}. Please select the maximum number of items that can be placed in the boxes.

○ 7

○ 8

● 9 ✓

○ 10

box-item
10-10
32-29
7-1
21-21
73-68
42-33
49-43
31-29
30-27

Question 3

1 / 1 point

Consider an interval scheduling problem instance: 12 jobs with [starting time, finish time) as follows: [2, 7), [3, 6), [1, 4), [1, 3), [0, 3), [7, 10), [2, 4), [6, 7), [3, 5), [4, 8), [5, 7), [8, 9). Please select **all** solutions that provide a maximum-size subset of mutually compatible jobs following the Greedy algorithm "Schedule the job with the earliest finish time".

□ [0, 3), [3, 6), [6, 7), [7, 10)

□ [0, 3), [3, 5), [5, 7), [7, 10)

☑ [0, 3), [3, 5), [5, 7), [8, 9)

☑ [1, 3), [3, 5), [6, 7), [8, 9)

Question 4

1 / 1 point

Question 4 1 / 1 point

Consider an **interval partition problem** instance: 12 jobs with [starting time, finish time) as follows: [6, 7), [3, 6), [1, 4), [1, 3), [0, 3), [7, 10), [2, 4), [6, 7), [3, 5), [4, 8), [5, 7), [8, 9). Please select **all** solutions that provide a minimum number of machines to schedule all jobs.

Must be in different machines because all have 3

□ machine 1: [0, 3), [7, 10)

machine 2: [1, 3), [3, 6), [8, 9)

machine 3: [1, 4), [4, 8)

machine 4: [2, 4), [6, 7)

machine 5: [3, 5), [5, 7), [6, 7)

☑ machine 1: [0, 3), [3, 5), [5, 7), [7, 10)

machine 2: [1, 3), [3, 6), [6, 7), [8, 9)

machine 3: [1, 4), [4, 8)

machine 4: [2, 4), [6, 7)

☑ machine 1: [0, 3), [3, 6), [6, 7)

machine 2: [1, 3), [3, 5), [6, 7)

machine 3: [1, 4), [5, 7), [7, 10)

machine 4: [2, 4), [4, 8), [8, 9)

☑ machine 1: [0, 3), [3, 5), [6, 7)

machine 2: [1, 3), [3, 6), [6, 7)

machine 3: [1, 4), [4, 8), [8, 9)

machine 4: [2, 4), [5, 7), [7, 10)

☑ machine 1: [0, 3), [3, 5), [6, 7)

machine 2: [1, 3), [3, 6), [6, 7)

machine 3: [1, 4), [4, 8), [8, 9)

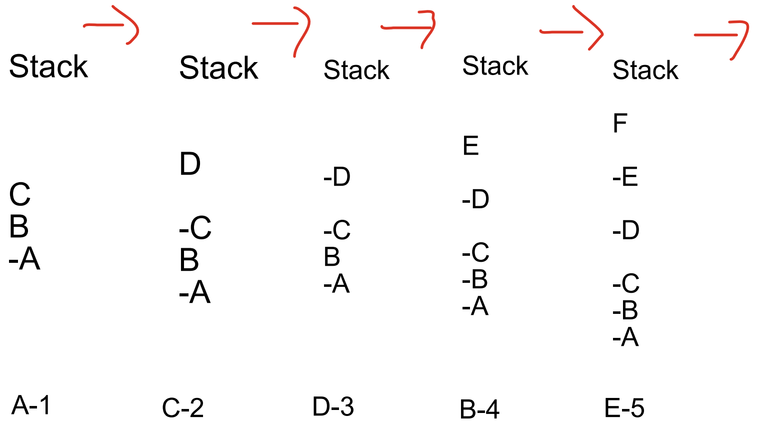
machine 4: [2, 4), [5, 7), [7, 10)

Question 5 **1 / 1 point**

Consider a directed acyclic graph (DAG) with 6 vertices labeled from A to F and the following directed edges:

- A → B
- A → C
- B → E
- C → D
- D → E
- D → F
- E → F

Ordering when pop:



Using the Topological-Sort algorithm in the lecture notes with the following conditions to compute the topological ordering: (1) Use S as a **Stack** in **Line 7** and **Line 11** of the algorithm. (2) When processing the neighbors of vertex v in Line 9, consider them in **alphabetical order**.

Please provide the topological order (1, 2, 3, 4, 5, 6) of the vertices for this graph.

__3__ D

__2__ C

__5__ E

__1__ A

__4__ B

__6__ F

__4__ B

__6__ F

Question 6

1 / 1 point

Consider a directed acyclic graph (DAG) with 6 vertices labeled from A to F and the following directed edges:

- A → B
- A → C
- B → E
- C → D
- D → E
- D → F
- E → F

A B C → A B C D → A B C D E → A B C D E F →

Using the Topological-Sort algorithm in the lecture notes with the following conditions to compute the topological ordering: (1) Use S as a **Queue** in **Line 7** and **Line 11** of the algorithm. (2) When processing the neighbors of vertex v in Line 9, consider them in **alphabetical order**.

Please provide the topological order (1, 2, 3, 4, 5, 6) of the vertices for this graph.

__4__ D

__1__ A

__3__ C

__6__ F

__2__ B

__5__ E

Done