

Last name	
First name	
Group	

Grade	
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Algorithmics
Undergraduate 2nd year - S3#
Final Exam #3 (P3)
14 December 2019
Answer Sheets

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Answers 1 (Spanning Forest – 2 points)

Spanning forest and extra-edges for the depth-first search of the graph G_1 :

Answers 2 (Union-Find – 3 points)

1. Number of vertices of each connected component:

C_1 : _____
 C_2 : _____
 C_3 : _____

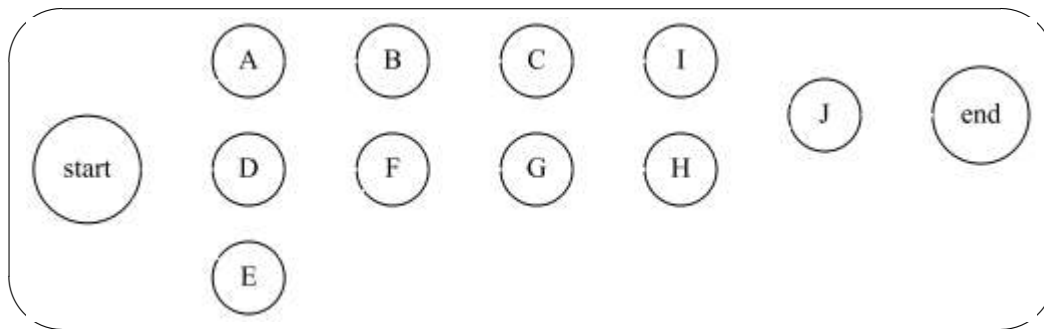
2. Edges to add: _____

3. Among the following chains, which can not exist in G ?

☐ 3 \leftrightarrow 7
 ☐ 11 \leftrightarrow 6
 ☐ 0 \leftrightarrow 13
 ☐ 4 \leftrightarrow 9

Answers 4 (Eat Crepes – 8 points)

1. Graph that represents the recipe:



2. (a) Topological sort to complete :

$$\boxed{start - D - \quad - \quad - B - \quad - \quad - G - \quad - \quad - \quad - end}$$

- (b) **Specifications:**

The function `topologicalSort(G)` returns a topological sort for the acyclic digraph G , where all the vertices are reachable from the vertex 0.

This image shows a full page of blank graph paper. The background is a very light gray, and it is covered by a precise grid of thin, medium-gray lines. The grid consists of small, equal-sized squares that extend across the entire area of the page, leaving no margins or other markings.

(c) **Specifications:**

The function `is_tri_topo (G, L)` tests if L can be a topological sort for the acyclic digraph G . The list L can be "destroyed".

A full page of blank graph paper with a uniform grid of small squares. The grid consists of 20 columns and 20 rows, creating a total of 400 squares. The lines are thin and black, set against a white background. There are no margins, text, or other markings on the page.

Answers 5 (What does it do? – 4 points)

1. Result returned by `build(G_3)`:

	0	1	2	3	4	5	6	7	8
V									

- ## 2. The function `what`

- (a) `what(G_3)` returns:

- (b) `what(G)` represents:

- (c) Property of the digraph G so that $\text{what}(G)$ does not "crash"?