

## Final Exam Practice Questions – SAMPLE SOLUTIONS

**Note:** The final exam is comprehensive. However, the following questions only focus on post-midterm material.

Suggested questions from the textbook:

Chapter 2 – question 3

Chapter 4 – questions 2, 5, 7(except i), and 10

Chapter 5 – questions 8, 9, and 11

**Question 1:** What is the output of the following Alice program? Do not describe what the program does; simply indicate the result of each **print** statement.

The screenshot shows the following code in the Alice environment:

```
world.my first method No parameters  
123 lst = 1, 2, 3, 4  
if is lst empty  
  print This is an empty list  
Else  
  For all lst, every 123 item_from_lst together  
    if item_from_lst < 2  
      increment item_from_lst by 1 more... in order  
      print item_from_lst  
    Else  
      decrement item_from_lst by 1 more...  
      print item_from_lst  
  Loop 2 times times show complicated version  
    remove item from beginning of lst more...  
if is lst empty  
  print The list is empty  
Else  
  print The list is not empty
```

**Question 2:** We need your help to complete an Alice program that represents a rescuing mission, with a helicopter object and a boat object.



The program is supposed to carry out the following:

1. The blades of the helicopter are rotating all the time.
2. The helicopter turns to face the lifeboat, approaches it and hovers over it, dropping down until it gets close to it (0.5 meter above the lifeboat).
3. At each step of the downward movement the helicopter moves down by 0.5 meter.

You will use the following to fill in the blanks in the program. To fill in the blanks, simply write the corresponding letter in the blanks:

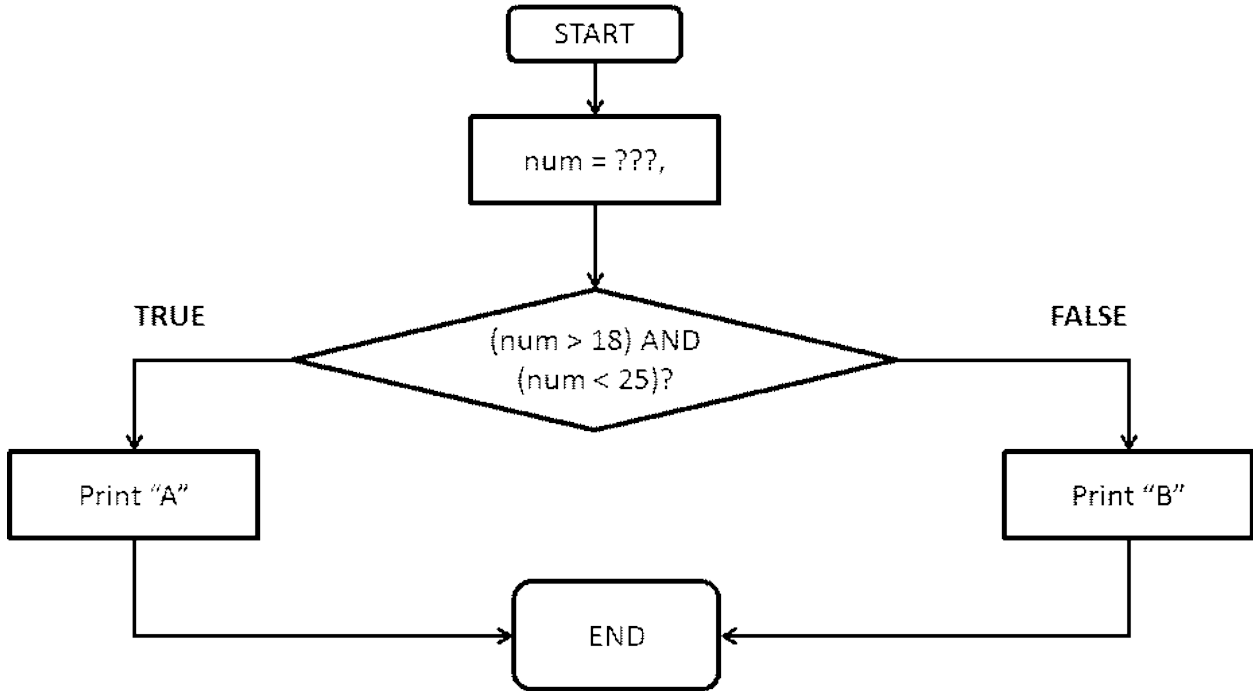
A	face
B	forward
C	together
D	move
E	In order
F	rotate
G	below
H	above
I	>
J	<
K	down

The image shows a Scratch script for a helicopter object. The script is organized into three main sections:

- Do Section (Purple background):**
  - Block: `helicopter.heli blade`
- Do Section (Yellow background):**
  - Block: `helicopter turn to [ ] lifeBoat more...`
  - Block: `helicopter move [ ] ( ( helicopter distance to lifeBoat.rowPerson.head - 1 ) )`
- While Section (Green background):**
  - Block: `While ( helicopter distance [ ] lifeBoat more... [ ] 0.5 )`
  - Block: `helicopter move [ ] 0.5 meters more...`

### Question 3

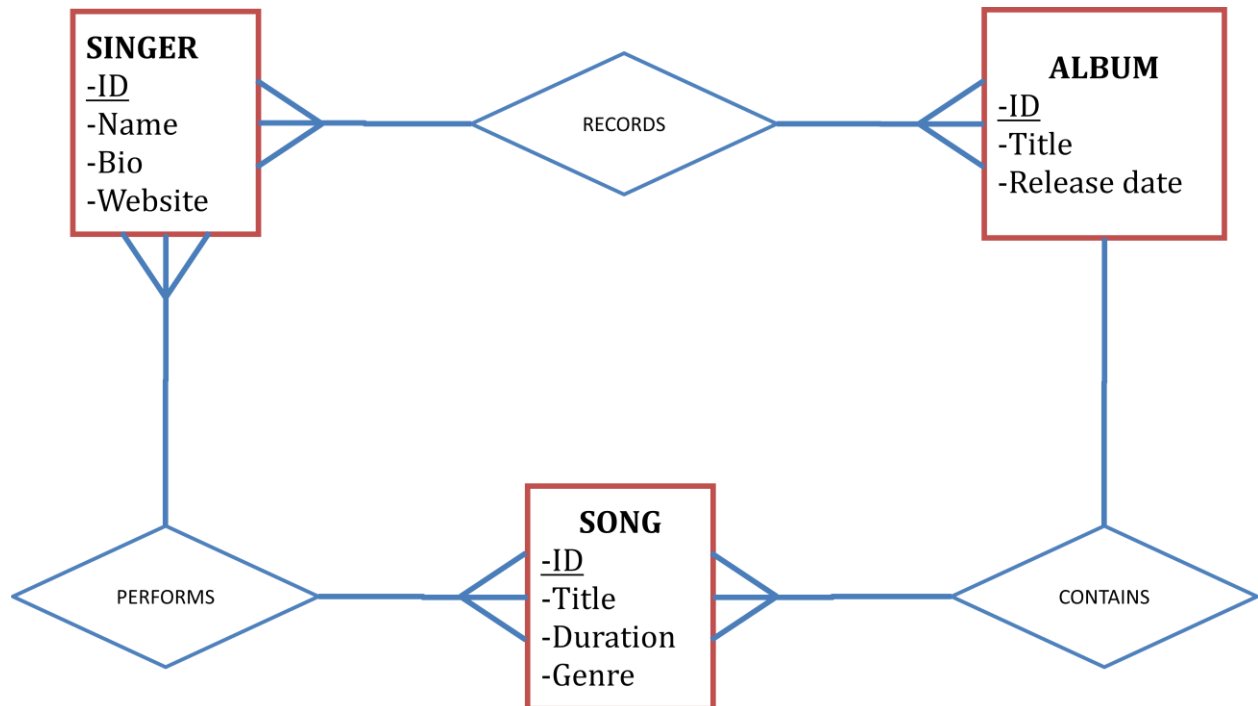
Given the values of 'num' specified in the table, you are to fill in the missing values of the table that describe the output printed with the following flowchart.



Value assigned to num	Output printed
17	
25	
19	

#### Question 4:

Consider the following ERD.



- Use Algorithm 4.2 starting on page 104 of your text to convert the above ERD to a database schema.

Write the following queries in SQL

- Retrieve all album (titles) that were released before '1-Jan-2011'
- Retrieve the names and biography of all singers that have a website (a singer with no Website has the Website value in the database recorded as NULL. In SQL, this condition can be determined by asking if Website IS NOT NULL)
- Retrieve all songs whose duration is inclusively between 2 and 4 minutes, but whose genre is pop or rock and roll, but not country.
- Retrieve the song titles for all albums, ordered alphabetically by album title and for songs from the same album by song title.
- Retrieve the average song duration for each singer. Your query can simply output the singer id and the average song duration for that singer. It is more challenging to output the singer name and the average song duration. Attempt formulating the latter (with the singer's name) only after successfully formulating and understanding the former (with the singer's id).