

Cairo University Faculty of Engineering

Computer Department

Easy C++

Software Requirements Specification (SRS)

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# Revision History

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Distribution list

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| **Name** | **E-mail** | **Notes** |
| Eng. Dina El Reedy |  | <Any useful remarks like *“reply needed”, “for approval”*, etc…> |

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# Software Requirements Specification

# Introduction

## Purpose

This document is intended to describe in detail the requirements of the android app “Easy C++”.

## Scope

Easy C++ is an educational android app used for explaining programming concepts

in C++ language. In it you can take lessons at your own pace, test your knowledge in its quizzes, interact with fellow learners and ask instructors for help.

## Definitions, Acronyms and Abbreviations

<This subsection should provide the definitions of all terms, acronyms, and abbreviations required to interpret properly the SRS.  This information may be provided by reference to the project Glossary.>

## References

[This subsection should provide a complete list of all documents referenced elsewhere in the SRS. Each document should be identified by title, report number (if applicable), date, and publishing organization. Specify the sources from which the references can be obtained. This information may be provided by reference to an appendix or to another document.]

## Overview

[This subsection should describe what the rest of the SRS contains and explain how the SRS is organized.]

# Market Survey

## Coursera and Udacity

### **Project Description**

Coursera and Udacity are websites in which you learn about many different specializations varying from robotics to art.

### **Functional Specifications**

**2.1.2.1 Registration**

both sites allow free registration via e-mail after which one can access a variety of courses directly.

**2.1.2.2 Layout**

both sites have a catalog of courses that users “enroll” in. there courses are divided into classes that users take at there comfortable pace.

**2.1.2.3 videos and** **quizzes**

classes in these courses are two parts, the first is an instructional video on a subject in the course and the second one is an interactive quiz about the information in the video

**2.1.2.4 Career Building**

a section for job hunting and recommendations

### **Non-Functional Specifications**

**2.1.3.1 Usability**

the courses are divided such that users can have hours long sessions or bite sized

lessons

**2.1.3.2 Accessibility**

the courses often start with no prerequisites and if they do this specify it with link to the prerequisite course.

**2.1.3.3 Maintenance**

many of the courses offered on both sites gets updated regularly

### **Limitations**

The main drawback is the limited interactivity. Although there are blogs and forums, instructors aren’t always available due to time zone difference.

## Summary

### **Functional Specifications**

#### ***Essential Specifications***

2.2.1.1.1 Registration: the first essential step for users to become students in the app

2.2.1.1.2 Home Page: the page that has the users data (classes they enrolled in, their progress in classes, their grades in quizzes,...etc)

2.2.1.1.3 classroom page: the page that has the content and material of the course (videos, texts, examples and quizzes about single specific topics)

2.2.1.1.4 forums: the page that allows interaction between students in the same course and allows instructors to answer question about the course.

#### ***Non-Essential Specifications***

2.2.1.2.1 achievements: medals and perks for students who excel in course (finish quickly with fewer mistakes in quizzes)

2.2.1.2.2 live chat and video call support: the ability to communicate in real time with students and instructors

### **Non-Functional Specifications**

#### ***Essential Specifications***

2.2.2.1.1 extendability: the app could be easily built upon and enhanced

2.2.2.1.2 flexibility: the content of courses should be changeable (for updating and fixing possible errors) and more-so within reach of instructors.

2.2.2.1.3 stability: the app (and database) should not crash under high traffic.

#### ***Non-Essential Specifications***

### **Limitations**

Regarding instructors unavailability region specific classrooms could help solve time zone difference related problems

# Cost Estimate

|  |  |  |
| --- | --- | --- |
| Item | Estimated Cost | |
| US Dollars | L.E. |
| 1. **Development Cost** |  |  | |
| 1.1. Software Engineers | 10000 | 170000 | |
| 1.2 Designers | 4000 | 68000 | |
| 1.3 Testers | 3000 | 51000 | |
| 1.2.Tools | 3000/year | 51000/year | |
| Total | 17000-3000/year | 289,250-51000/year | |
| **2. Deployment Cost** |  |  | |
| 1.1 Maintenance | 300/month | 5100/month | |
| 1.2 Servers | 750/year | 12750/year | |
| 1.3 Marketing | 6000 | 102000 | |
| Total | 6000-750/year-300/month | 102000-5100/month-12750/year | |
| Total Estimated Cost | 23000-3750/year-300month | 391,250-63,750/year-5100/month | |

**Table 2: Cost Estimate**

# Feasibility Study

Business Justification:

* It will add full functional android app that serves as a community for young programmers and their instructors

System Engineering

* System will be developed using android studio, mysql database and java programming language
* Project will be done within budget as expenditures are all fixed and not price-changing  
   Time constraints (e.g. exams, other projects, deadlines,...etc) will be handled  
  effectively by tasks assignment on well managed time plan

System Integration:

* This system can be easily expanded with larger functionalities later
* This system can be efficiently integrated with a college system

# Requirements Specifications

## User Requirements (User Stories)

|  |  |
| --- | --- |
| * **identifier** | **Description** |
| * **US-01** | As a learner I need to have a private account so that I can see my own progress |
| * **US-02** | As a learner I need levels of content so that I can’t see stuff above my level |
| * **US-03** | As a learner I need to see my quizzes grades |
| * **US-04** | As a learner I need to be able to ask questions and answer other learner’s questions |
| * **US-05** | As a learner I want to see other student’s questions and answers |
| * **US-06** | As an learner I want to be able to change my password/ username/email |
| * **US-07** | As a learner I want to be able to apply to become an instructor after I finish all levels |
| * **US-08** | As an instructor I need to have private identity so that other learners see me as an instructor |
| * **US-09** | As an instructor I need to be able to put different learning content to learners |
| * **US-10** | As an instructor I need to be able to put questions |
| * **US-11** | As an instructor I need the quizzes to be different every time a learner takes a quiz |
| * **US-12** | As an instructor I want to report on bad learner to admin who should be suspended |
| * **US-13** | As an instructor I want to see how good the learners do in levels by seeing the average of quizzes grades so that I know which section has incomplete information |
| * **US-14** | As an instructor I need to be able to answer to student questions |
| * **US-15** | As an instructor I don’t want any student to take higher level of information above his level |
| * **US-16** | As an instructor I want to be able to change my password/ username/email |
| * **US-17** | As an instructor I want to log in to the app using my username and password |
| * **US-18** | As an admin I need to approve to a user to be a teacher so that not any user could make himself an instructor |
| * **US-19** | As an admin I need to see any report has been made by instructor |
| * **US-20** | As an admin I need to be able to approve if a learner wants to become instructor |
| * **US-21** | As an admin I want every user to create an account to be able to access to app |
| * **US-22** | As an admin I want a section to take users opinions about the app |
| * **US-23** | As an admin I want to be able to change my password/ username/email |
| * **US-24** | As an admin I want to enter the app from the log in menu using my  username and my password |
| * **US-25** | As an admin I want every user can know his username and password  If he forgot it |
| * **US-26** | As a learner I want to take quizzes so that I train myself more |
| * **US-27** | As a learner I want to set an answer as the best answer to my question |

## System Requirements (Use Cases)

### Logging in the app

**Name:** Login in

**Identifier:** UC-01

**Preconditions**

1. When the app open

**Basic Course**

1. Fill username
2. Fill password
3. Click on login

**Alternate Course A:**

**Condition:** if the app didn’t recognize the username/password

**Action**: show message to inform him to check username / password

**Post conditions**

1. Open the main menu (student, instructor or admin) according to the account

**Map to:**

1. US-01
2. US-17
3. US-24

### Signing up

**Name:** sign up

**Identifier:** UC-02

**Preconditions**

1. If the user doesn’t have an account in logging in form so he clicks on sign up

**Basic Course**

1. Fill username
2. Fill password
3. Fill email
4. Choose if you want to be instructor or learner
5. Click on the sign-up button

**Alternate Course A:**

**Condition:** if there is any another user have the same username

**Action**: show message to inform him to change username

**Post conditions**

1. Show him a message that he successfully created the account
2. Go to log in form

**Map to:**

1. US-01
2. US-08
3. US-21

### Recovery username/password form

**Name:** Forgot your password

**Identifier:** UC-03

**Preconditions**

1. In the log in form if he forgot his username/ password

**Basic Course**

1. Put his email that he used when he made his account

**Alternate Course A:**

**Condition:** the app didn’t identify his email

**Action**: show message to make him check his email

**Post conditions**

1. Show him a message that the system successfully sent a new username and password
2. Go to log in form

**Map to:** US-25

### Take a quiz

**Name:** quiz form

**Identifier:** UC-04

**Preconditions**

1. Main menu

**Basic Course**

1. Check the level he wants to take a quiz in
2. the quizzes are all equal or below his level

**Post conditions**

1. the quiz is created for him randomly

**Map to:**

1. US-11
2. US-26

### the quiz starts

**Name:** solve the questions

**Identifier:** UC-05

**Preconditions**

1. quiz form

**Basic Course**

1. he answers to all question or the questions he knows its answer
2. after he finishes, he should click on the mark button

**Post conditions**

1. he goes to the grade form

**Map to:** US-26

### Approval to instructor

**Name:** Approval form

**Identifier:** UC-06

**Preconditions**

1. Main menu

**Basic Course**

1. See all the instructors that made an account and waiting for approval to be able to log in
2. Approve or decline

**Map to:** US-18

### Take an action to the reports

**Name:** Report form

**Identifier:** UC-07

**Preconditions**

1. Main menu

**Basic Course**

1. See all the reports that a user made
2. Take an action

**Post conditions**

1. Show him a message that the system successfully sent a new username and password
2. Go to log in form

**Map to:** US-19

### Submitting a report

**Name:** reporting

**Identifier:** UC-08

**Preconditions**

1. User must be log in
2. User must be at the category he wants to report on

**Basic Course**

1. Choose the kind of report the you want
2. Submit the report

**Post conditions**

1. Show successfully message about submitting report
2. Continue from where you left

**Map to:** US-12

### taking opinions

**Name:** feedback

**Identifier:** UC-08

**Preconditions**

1. main menu
2. learner or instructor

**Basic Course**

1. write the feedback you want
2. Submit the feedback

**Post conditions**

1. Show successfully message about submitting feedback
2. Return to main menu

**Map to:** US-22

### Check information for current level

**Name:** information at the same level

**Identifier:** UC-010

**Preconditions**

1. Main menu
2. Signed as learner

**Basic Course**

1. Show only content at a level less or equal to his level

**Post conditions**

1. Click on any content and show it

**Map to:** US-02

### Statistics about grades

**Name:** learners grades

**Identifier:** UC-011

**Preconditions**

1. Signed as instructor
2. Main menu

**Basic Course**

1. See statistics about the average grade of a level

**Map to:** US-13

### Putting questions

**Name:** questions form

**Identifier:** UC-12

**Preconditions**

1. Signed as instructor
2. Main menu

**Basic Course**

1. Choose the level of the question
2. Put the question
3. Choose the answer true or false
4. Submit the question

**Alternate Course A:**

**Condition:** check the question in the right level and the question is well defined

**Post conditions**

1. Show him a message that the question successfully has been submitted
2. Back to main menu

**Map to:** US-10

### Putting content

**Name:** content form

**Identifier:** UC-13

**Preconditions**

1. Signed as instructor
2. Main menu

**Basic Course**

1. Choose the level of the content
2. Choose the category name or write new category
3. Name the topic
4. Write the topic
5. Submit the topic

**Alternate Course A:**

**Condition:** check the topic in the right level and the topic is well defined

**Post conditions**

1. Show him a message that the topic successfully has been submitted
2. Back to main menu

**Map to:** US-09

### Discussion

**Name:** discussion room

**Identifier:** UC-14

**Preconditions**

1. Main menu

**Basic Course**

1. See other learner’s questions
2. Choose the level of the question
3. Choose the question answered or not answered
4. Choose if you want to see your questions only
5. Click on any question you want to see

**Post conditions**

1. Open the questions and the answers

**Map to:** US-05

### Submitting question in discussion room

**Name:** question in discussion room

**Identifier:** UC-15

**Preconditions**

1. Discussion room
2. Signed as learner

**Basic Course**

1. Choose the level of the question
2. Write the question
3. Submit the question

**Post conditions**

1. Go to discussion room

**Map to:** US-04

### Submitting an answer in discussion room

**Name: answer in discussion room**

**Identifier** UC-16

**Preconditions**

1. A question in discussion room
2. Signed as learner or instructor

**Basic Course**

1. Write an answer
2. Submit the answer

**Post conditions**

1. Return to the question

**Map to:**

1. US-04
2. US-14

### setting an answer in discussion room as the best answer

**Name:** best answer in discussion room

**Identifier:** UC-17

**Preconditions**

1. A question form in discussion room
2. Signed as learner
3. Must be the person who put the question

**Basic Course**

1. Select it as an answer

**Alternate Course A:**

**Condition:** if I want to delete the action when I know after that the answer is not the right answer

**Action**: push the unselect button

**Post conditions**

1. Remain in the same page

**Map to:** US-27

### See the grades for the quizzes that I take

**Name:** quizzes grades form

**Identifier:** UC-18

**Preconditions**

1. Signed as learner
2. Main menu

**Basic Course**

1. See in order the level of the quiz and the grade

**Post conditions**

1. Return in main menu

**Map to:** US-03

### Change username/password/email

**Name:** Option menu

**Identifier:** UC-19

**Preconditions**

1. Main menu

**Basic Course**

1. Choose one of the three options (change username, change password or change email)

**Alternate Course A:**

**Condition:** if there is any another user have the same username

Action: show message to inform him to change username

**Post conditions**

1. Open to him the form for the option he selects it

**Map to:**

1. US-06
2. US-16
3. US-23
4. US-16

### Change username

**Name:** change username form

**Identifier:** UC-20

**Preconditions**

1. Option menu

**Basic Course**

1. Fill the text where you want to change your username
2. Click on change your username

**Alternate Course A:**

**Condition:** if there is any another user have the same username

**Action**: show message to inform him to change username

**Post conditions**

1. Show him a message that he successfully changed his username

**Map to:**

1. US-06
2. US-16
3. US-23
4. US-16
   * 1. *Change password*

**Name:** change password form

**Identifier:** UC-21

**Preconditions**

1. Option menu

**Basic Course**

1. Fill the text where you want to change your password
2. Click on change your password

**Post conditions**

1. Show him a message that he successfully changed his password

**Map to:**

1. US-06
2. US-16
3. US-23
4. US-16
   * 1. *Change email*

**Name:** change email form

**Identifier:** UC-22

**Preconditions**

1. Option menu

**Basic Course**

1. Fill the text where you want to change your email
2. Click on change your email

**Post conditions**

1. Show him a message that he successfully changed his email

**Map to:**

1. US-06
2. US-16
3. US-23
4. US-16
   * 1. *Apply to become instructor*

**Name:** apply to become instructor

**Identifier:** UC-23

**Preconditions**

1. Option menu

**Basic Course**

1. Show a message to confirm that he actually want to become an instructor
2. Click on apply

**Post conditions**

1. Show him a message that he successfully applied to become an instructor

**Map to:** US-07

### Approval to student to become instructor

**Name:** Approval form for students

**Identifier:** UC-24

**Preconditions**

1. Main menu
2. Signed as admin

**Basic Course**

1. See all student who are applied to become an instructor
2. Approve or decline

**Map to:** US-20

## Non-functional Requirements

5.3.1 Fast Response time

**ID:** NF1

**Description:** System should be able to respond quickly during any request such as

searching the database, saving operations, etc...

**Addressing:** US-1 ... US-27

5.3.2 User-Friendly Design

**ID:** NF2

**Description:** the app design should be user friendly and easy to follow

**Addressing:** US-1 ... US-27

# High level plan

**Iteration 1**:

|  |  |  |
| --- | --- | --- |
| User Stories | Estimated Time | |
| US-01 | 5 | |
| US-06 | 2 | |
| US-08 | 2 | |
| US-16 | 2 | |
| US-17 | 2 | |
| US-18 | 3 | |
| US-21 | 1 | |
| US-24 | 1 | |
| US-25 | 1 | |
| **Total Time** | **19** |

**Iteration 2**:

|  |  |  |
| --- | --- | --- |
| User Stories | Estimated Time | |
| US-02 | 4 | |
| US-04 | 7 | |
| US-05 | 6 | |
| US-09 | 6 | |
| US-14 | 7 | |
| US-15 | 3 | |
| US-20 | 3 | |
| US-23 | 3 | |
| US-27 | 4 | |
| **Total Time** | **36** |

**Iteration 3**:

|  |  |  |
| --- | --- | --- |
| User Stories | Estimated Time | |
| US-03 | 4 | |
| US-07 | 2 | |
| US-10 | 7 | |
| US-11 | 3 | |
| US-12 | 3 | |
| US-13 | 4 | |
| US-19 | 7 | |
| US-22 | 4 | |
| US-26 | 5 | |
| **Total Time** | **39** |

**Table 1: High Level Plan**

# Supporting Information

**Appendix A**

**Traceability Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| US  Uc | **US-01** | **US-02** | **US-03** | **US-04** | **US-05** | **US-06** | **US-07** | **US-08** | **US-09** | **US-10** | **US-11** | **US-12** | **US-13** | **US-14** | **US-15** | **US-16** | **US-17** | **US-18** | **US-19** | **US-20** | **US-21** | **US-22** | **US-23** | **US-24** | **US-25** | **US-26** | **US-27** |
| 01 | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  | \* |  |  |  |
| 02 | \* |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |
| 03 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |
| 04 |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |
| 05 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |
| 06 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |
| 07 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |
| 08 |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 09 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |
| 10 |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13 |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15 |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  | \* |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |
| 18 |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 19 |  |  |  |  |  | \* |  |  |  |  |  |  |  |  | \* | \* |  |  |  |  |  |  | \* |  |  |  |  |
| 20 |  |  |  |  |  | \* |  |  |  |  |  |  |  |  | \* | \* |  |  |  |  |  |  | \* |  |  |  |  |
| 21 |  |  |  |  |  | \* |  |  |  |  |  |  |  |  | \* | \* |  |  |  |  |  |  | \* |  |  |  |  |
| 22 |  |  |  |  |  | \* |  |  |  |  |  |  |  |  | \* | \* |  |  |  |  |  |  | \* |  |  |  |  |
| 23 |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |
| NF1 | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* |
| NF2 | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* | \* |

**Appendix B**

**Dependability Matrix**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **US** | **01** | **02** | **03** | **04** | **05** | **06** | **07** | **08** | **09** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** |
| **01** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  | \* |  |  |  |  |  |  |
| **02** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **03** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **04** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **05** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **06** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |
| **07** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **08** | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |
| **09** |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **10** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **11** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **12** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **13** |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **14** |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **15** | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **16** |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **17** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **18** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **19** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **20** |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  | \* |  | \* |  |  |  |  |  |  |  |
| **21** | \* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **22** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **23** |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |
| **24** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **25** |  |  | \* |  |  | \* |  |  |  |  |  |  |  |  |  | \* |  |  |  |  |  |  |  |  |  |  |  |
| **26** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **27** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |