Autumn 2021: Web Application Assignment

Due by 7:00pm on Friday 28th May 2021 **Assessment Weight: 30%**

A. Requirements

a) ALL instructions given in this document MUST be followed to be **eligible** for full marks for the Web Application Assignment. This document has eleven (11) pages in total including nine (9) Appendices.
b) This assignment is **NOT** a group assignment; collusion, plagiarism, cheating of any kind is not acceptable. As part of your submission you MUST certify that all work submitted is your own. If you cannot honestly certify that the work is your own then do not submit the assignment. Breaches of the Misconduct Rule will be dealt with according to the university policy (see the learning guide for more information).
c) All assignment submissions will be checked for academic misconduct using the MOSS program from Stanford University.
d) Design the web pages with ease of navigation and operation, attractiveness, and accessibility in mind. Images other than those provided in the assignment zip file may also be used in the assignment.
e) Your code must guard against SQL injection and Cross Site Scripting attacks. That is, sanitise user input.
f) All assignment files are to be uploaded in the **project** folder in your TWA web site on the TWA server as follows:
   - php and html files in the `project` folder
   - css files in the `project/css` folder
   - images in the `project/images` folder
   - javascript in the `project/javascript` folder.

   Note: Compressed archive files (eg, zip, tar etc) are not acceptable and will not count toward submission requirements

g) Complete the full submission process before the due date and time. See section D for details of the submission process.
h) All styling and page layout must be achieved using CSS. The use of Bootstrap or other frameworks is not permitted.
i) jQuery or similar are not permitted.

For the problem definition described in section B you must

j) include your authorship details at the top of **each file** in coded comments;
k) **reference** all sources that you used for inspiration of your solution as per Section C of this document;
l) ensure that your web application renders correctly in Chrome and runs correctly from the TWA web server.

B. Web Application Assignment Details

B(i) - Background information and description

The A-League is Australia's highest-level men's soccer league (competition). The 2020/21 competition is contested by professional players in twelve teams from Australia and New Zealand. The regular season of the competition is played from summer through to winter for twenty-four weeks of matches (fixtures) with the top six ranked teams then advancing to a Finals Series culminating in a Grand Final to determine the competition winner. The rankings of each team on 26th April are shown in Appendix 1. The ranking of each team on a weekly basis produces what is commonly known as the competition **ladder**.

For each week of the competition, a series of matches (fixtures) are played between the twelve teams; this is known as the draw**.** The number of matches played each week vary according to the official A-League draw[1]. Each match played produces a result; either win, loss, or draw for the two teams involved. At the conclusion of each match the results from the match are entered into a database to produce the competition ladder in which each team is ranked according to the total number of competition points achieved to date (see Appendix 2 for a description of how competition points are accumulated). Hence, at the completion of any given match, or week of matches, the competition ladder may have different

[1] The A-League 2020/21 season draw can be viewed at https://www.a-league.com.au/sites/aleague/files/2020-11/A-League%202020_21%20Season%20Draw%2024112020.pdf

team rankings depending upon the total number of wins, draws and losses for each team. For teams that are on the same number of competition points a **goal differential** is used to determine the correct rank of each team (see Appendix 3 for an explanation of goal differential).

In this assignment, you will create a web application that is able to generate the competition ladder for the 2020/21 A-League season, display match (fixture) information for any week of the competition, display fixture information for any A-League team, and update match results. To achieve this your web application will need to process data from HTML web forms and from the A-League Competition database. The application will also need to generate output data that is displayed in the user's browser and updated in the A-League Competition database.

- The specific functional requirements for the assignment are described in section B(ii) of this document.
- The A-League Competition database is described in section B(iii) of this document.
- The purpose of the supplied images is described in section B(iv) of this document.
- Information about HTML, CSS, JavaScript, and PHP files is provided in section B(v) of this document.

B(ii) – Functional Requirements

Your Web Application **must**

- be coded using HTML 5, CSS, JavaScript, and PHP **as necessary**. Note: all files described below must be PHP files to achieve the server-side functionality.
- provide easy-to-use navigation for the user. The main functionality of the web application will be accessed by the user via the following hypertext links:

  `A-League` `Ladder` `Fixtures` `Enter Results` `Logoff`

- provide the following page content and functionality for each page as described

---

A-League Page (index.php) and Web Application Start-Up

Page purpose/description:

Normally, a web application such as this would automatically determine the current week based upon the server's current date. However, to assist with testing of the application it is suggested that you use the provided **index.php** file as your landing page for the application.

The supplied Index.php page enables the user to choose between using the current server date to determine the week or to use form input from the user. This will make testing and marking easier. This page will need further php code added to it to achieve the required functionality, but the main structure has been provided. Make sure that the user input is sanitised.

The design of the index page may be changed to fit with the overall design of your web application.

Hint: This page will also enable you to implement a way for the user to identify the **current week** of the competition if you are not able to implement functionality based upon dates.

Ladder Page (ladder.php)

Page purpose/description:

This page provides the user with a display of the **ladder** (team rankings) **at the current date**. See Appendix 1 which shows the ladder on 26th April 2021 as an example. The data items that must be displayed in the ladder are:

`Position (Rank), Team Emblem, Team Name, Played, Won, Drawn, Lost, Goals For, Goals Against, Goal Differential, Total Competition Points, Last 5 Results (win/draw/loss)`

As per the example shown in Appendix 1, the ladder must be displayed such that the highest ranked team is displayed at the top of the output followed by the team ranked second, then third, and so on until the lowest ranked team is displayed last.

Fixtures Page (fixtures.php)

Page purpose/description:

This page provides the user with **multiple views** of data for the matches in the competition. The views are as follows:

- **weekly fixture view**: This is the default view that is to be displayed when the `Fixtures` link is clicked and must show **all fixtures** for the **current week** as shown by the example in Appendix 4. The data items that must be displayed are:

```
Week Number, Home Team Emblem and Name, Away Team Emblem and Name, Date of
Fixture, Kick Off Time, Venue Name.
```

AND for any match that has been completed then also display

```
Home Team Score, Away Team Score
```

The venue name for each fixture should be a hypertext link; when clicked, the link will open **venue.php** in a new tab so that the user can view a map of where the venue is located. The venue page is described below.

After this default view has been displayed, the user may choose a different week to be displayed by using an appropriate input device on the page. Doing so will display **all fixtures** for the **chosen week instead of the current week**. The user should be able to choose any week of the competition.

If any matches in either the current week or chosen week have been completed, then the scores of the matches must be shown (see Appendix 6 for example output for Week 1 with match scores shown).

- **team fixture view**: The second view will display **all fixtures** for a **chosen team** starting from the current week to the end of the regular season (week 24)**.** To achieve this the user chooses a team from the team drop-down list; the page will then display **all fixtures** for the **chosen team** (see Appendix 5 for example output for Macarthur FC). The user should be able to choose any team in the competition. The user should also be able to choose to display all weeks of the competition so that they can view all match results for their chosen team. The data items that must be displayed are:

  ```
  Week Number, Home Team Emblem and Name, Away Team Emblem and Name, Date of
  Fixture, Kick Off Time, Venue Name.
  ```

  AND for any match that has been completed then also display

  ```
  Home Team Score, Away Team Score
  ```

  The venue name for each fixture should be a hypertext link; when clicked, the link will open **venue.php** in a new tab so that the user can view a map of where the venue is located. The venue page is described below.

Enter Results Page (scoreEntry.php)

Page purpose/description:

This page enables the score to be entered for a completed match. When the score has been entered for the match, the web application should calculate and update team statistics (eg, number of matches played, won, lost, drawn, etc) in the database.

The web application will need to display the details for each match in the current week, allow the user to choose a match, and obtain the score for the home-team and the away-team for the chosen match. The scores for each team **must** be validated **both client-side**, using JavaScript, **and server-side**, using PHP, **before** being written to the database. **Validation Rule:** The score for both teams in the chosen match are required and must be zero or positive whole numbers only. Make sure that the user input is sanitised. Only use in-page error notifications.

Access to this page is for the administrators of the web application only. Hence, this page must be protected by appropriate authentication and access control. When the link to this page is clicked, and if the user is not logged-in, the user must be redirected to the **login** page (**login.php**) where login details can be authenticated [the login page is described below]. Upon successful authentication, the user will be redirected to the **scoreEntry** page where scores for the current week matches can be entered as described above.

Venue Page (venue.php)

Page purpose/description:

This page displays the chosen venue's name, address and a google map showing the location of the venue by using a marker on the map.

Administrator Login Page (login.php)

Page purpose/description:

The purpose of this page is to provide a login facility for the administrators of the A-League 2021 web application. Some of the functionality described in previous pages is only available to users after they have logged in.

Page content and functionality:

The page will:

- include a postback login form that contains
  - a text box to capture the **administrator username (email)**
  - a password box to capture the **administrator password**
  - a submit/log in button

When the form is submitted by the user the page will need to **authenticate** the credentials (**`username`** and **`password`**) as supplied by the user in the login form against the records in the **`leagueAdmin`** table of the database. Make sure that the user input is sanitised.

The page will allow or deny access to the relevant pages depending on the result of authentication as follows:

a. **Successful login attempt**: Successful authentication should automatically redirect the user to the scoreEntry page.

b. **Failed login attempt:** Unsuccessful authentication should automatically redirect to the login page so that the user may try to login again. An appropriate error message must be displayed to the user if the login attempt fails. The message display must be implemented using appropriate PHP server-side code; it is not to be a JavaScript alert (or any other browser side component). The message should be displayed in an appropriate location on the login page in a suitable colour.

Note on Administrator Login Credentials:

The passwords that are stored in the **`leagueAdmin`** table of the database are encrypted using the sha256 algorithm (the passwords are not salted - to decrease the complexity of implementation). A list of administrator `usernames` and (plain text decrypted) `passwords` can be found in the **Administrator Credentials** in appendix 9.

Log Off Page (logoff.php)

The purpose of this page is to log the administrator off the web application and automatically return them to the Index page. The Log Off page must not display anything to the user. The page should remove all session variables and end the session (if sessions were used). It should then automatically redirect to the Index page. Navigation links to this page should only be visible to logged-in users.

B(iii) – Database information: A-League Competition database

1. You have been provided with your own copy of the A-League2021 database on the TWA server. To access this database, you need to use a username and password. Details on how to connect to **your copy** of the database are in **appendix 8.**

2. The tables within the A-League2021 database have already been populated with some data. Use the supplied `allTables.php` script to view the data (make sure you use the connection information described in **appendix 8**).

3. Tables in the A-League2021 database are described in the **A-League2021 Data Dictionary in appendix 7**.

4. A list of administrator user names and [plain text decrypted] passwords can be found in **Administrator Credentials in appendix 9**.

B(iv) – Team emblems/logos

An image has been provided in the assignment zip file for each team of the A-League competition. The image represents the team emblem/logo. Do not change the names of these files. Upload these files to the `project/images` folder of your TWA web site. The filename of each image file is stored in the teams table of the A-League Competition database. You can use this data from the database to display the correct emblem for each team when needed in your pages.

B(v) – HTML, CSS, JavaScript, and PHP files

A css file (projectMaster.css) has been provided to you. This css file includes minimal style rules for the purpose of displaying the supplied index.php page. Add your css rules to this file. Existing styles within the file may be changed to fit

with your overall design. You may create additional css files if you wish. All css files should be uploaded to the `project/css` folder of your TWA website.

A JavaScript file has **not** been provided. Some functionality in the web site will need to be achieved using JavaScript (eg, the client-side validation). Create a JS file called projectScript.js. Add your JavaScript to this file. The JavaScript file should be uploaded to the `project/javascript` folder of your TWA website.

All pages listed in section B(ii) will need to be PHP files to achieve the required server-side functionality. Additional PHP and HTML files may also be created as part of your solution if desired if doing so does not contradict/negate the stated page requirements. PHP and HTML files should be uploaded to the `project` folder of your TWA website.

C. Referencing

Referencing must follow the guidelines given in Section 2.5.3 of the TWA Learning Guide.

D. Submission Procedure

To submit your Assignment, you must do the following by the due date and time specified on page 1 of this document.

1. Upload all assignment files in the **project** folder in your TWA web site on the TWA server as follows:
    a. php and html files in the `project` folder
    b. css files in the `project/css` folder
    c. images in the `project/images` folder
    d. javascript in the `project/javascript` folder.
2. Run the submission script located at

    `http://twaaut.cdms.westernsydney.edu.au/submit/submit.asp`

    As part of the submission, you will be prompted for your TWA website username and password. You will then be asked to read the WSU policy on misconduct and certify that work submitted by you is your own work. This action will be logged in a database for future reference and is deemed to be evidence that you claim that your work is original. Next, you will need to select from a drop-down list the Assessment you are submitting, eg, Assignment 1, and click the ***Submit Assessment*** button. The web page will then display a listing of the files you have submitted along with a receipt number. You should print this page for proof of submission.

E. Marking Criteria and Standards

The marking criteria and standards for the Web Application Assignment are published in Section 2.5.3 of the Learning guide and will be used to assess your assignment submission according to the specific weightings identified in the table below:

CRITERIA	WEIGHT
CODE FUNCTIONALITY/CORRECTNESS	60%
WEB PAGE DESIGN	25%
FORM DESIGN	10%
CODE READABILITY	5%

~~ Appendices start on the next page ~~

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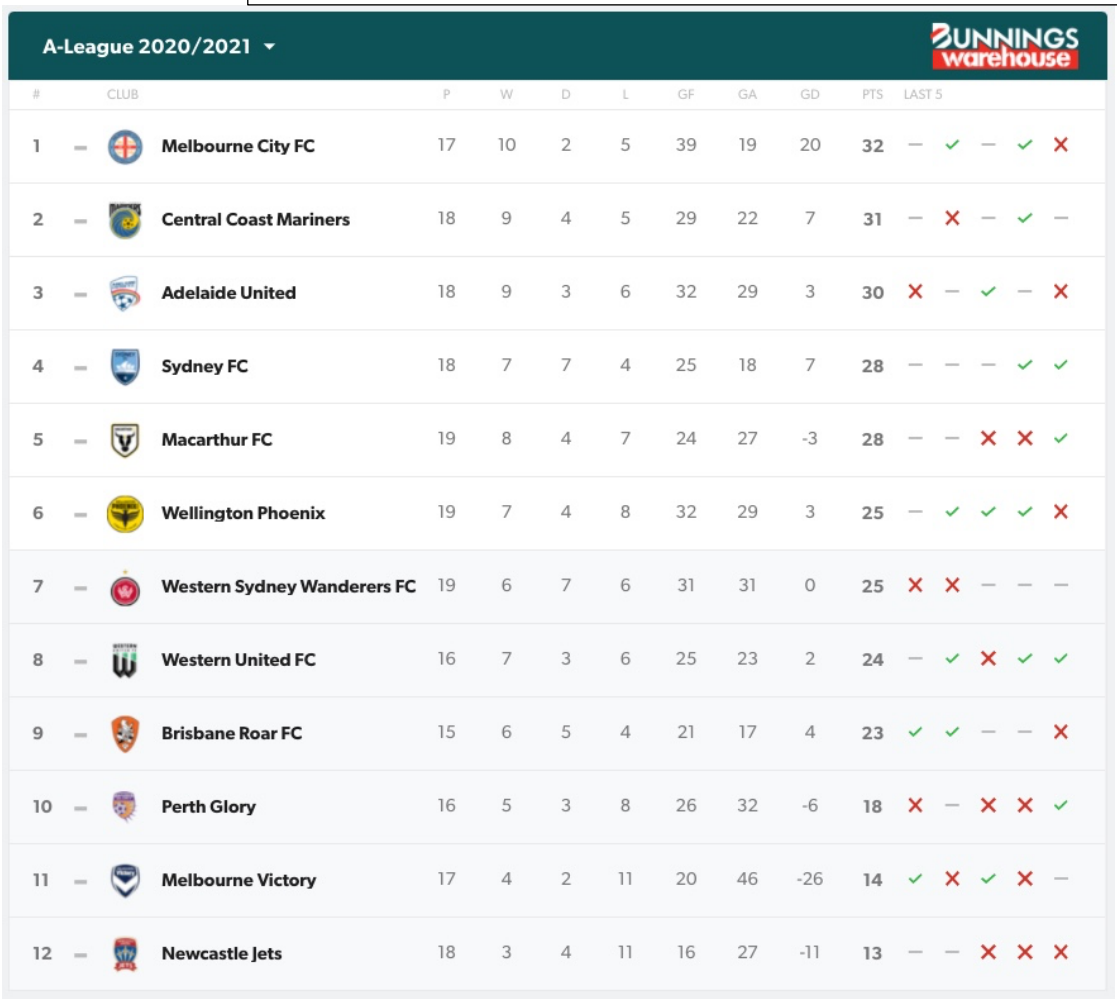
Appendices

The screen shots included in the appendices from www.a-league.com.au are **not** intended to depict the required screen design or layout – they should be viewed as examples only. In fact, there are better designs that could be applied to achieve a more appealing and useful user interface for several of the pages. You are to design your own screen layouts for this assignment.

Appendix 1 – Example information display for Ladder page on 26th April 2021

The screen shots in this document are sourced from https://www.a-league.com.au and are used for educational purposes only.

Screen shot from `https://www.a-league.com.au/ladder`



A-League 2020/2021

#		CLUB	P	W	D	L	GF	GA	GD	PTS	LAST 5
1	–	Melbourne City FC	17	10	2	5	39	19	20	32	– ✓ – ✓ ✗
2	–	Central Coast Mariners	18	9	4	5	29	22	7	31	– ✗ – ✓ –
3	–	Adelaide United	18	9	3	6	32	29	3	30	✗ – ✓ – ✗
4	–	Sydney FC	18	7	7	4	25	18	7	28	– – – ✓ ✓
5	–	Macarthur FC	19	8	4	7	24	27	-3	28	– – ✗ ✗ ✓
6	–	Wellington Phoenix	19	7	4	8	32	29	3	25	– ✓ ✓ ✓ ✗
7	–	Western Sydney Wanderers FC	19	6	7	6	31	31	0	25	✗ ✗ – – –
8	–	Western United FC	16	7	3	6	25	23	2	24	– ✓ ✗ ✓ ✓
9	–	Brisbane Roar FC	15	6	5	4	21	17	4	23	✓ ✓ – – ✗
10	–	Perth Glory	16	5	3	8	26	32	-6	18	✗ – ✗ ✗ ✓
11	–	Melbourne Victory	17	4	2	11	20	46	-26	14	✓ ✗ ✓ ✗ –
12	–	Newcastle Jets	18	3	4	11	16	27	-11	13	– – ✗ ✗ ✗

Key for screen output displayed above:

COLUMN HEADING	MEANING	FURTHER DESCRIPTION
#	Position or Rank	The ranking is determined based upon accumulated competition points (see Appendix 2) and a Goal Differential (see Appendix 3) if necessary.
CLUB	Emblem & Name of Team	Team emblem image, Team name
P	Number of matches played	
W	Number of matches won	
D	Number of matches drawn	
L	Number of matches lost	
GF	Goals For	Total number of goals scored by the team
GA	Goals Against	Total number of goals scored against the team
GD	Goal Differential	GD = GF - GA
PTS	Total Competition points	See Appendix 2.

Appendix 2 – Accumulating Competition Points

For each match that a team plays they receive three (3) points for a win, one (1) point for a draw, and zero (0) points for a loss.

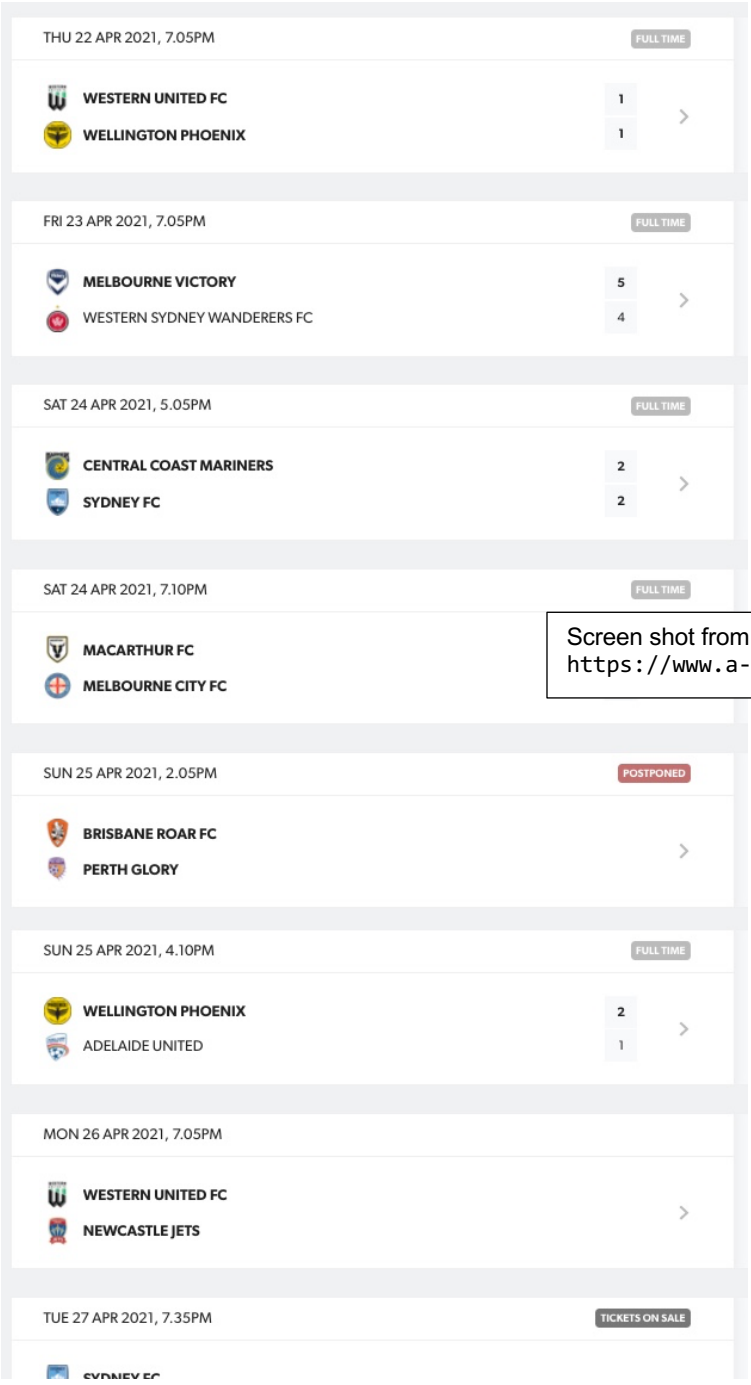
Appendix 3 – Goal Differential

When two or more teams have accumulated the same number of total competition points the correct ranking of the teams is determined by using a 'goal differential'.

The Goal Differential is calculated as 'Goals For' minus 'Goals Against' (ie, GD = GF - GA). The team with a larger goal differential is ranked higher than a team with a smaller goal differential.

For example, as shown in Appendix 1, Sydney FC (Pos 4) is ranked ahead of Macarthur FC (Pos 5) since their goal differential (25 – 18 = **7**) is greater than the score differential (24 – 27 = **-3**) of Macarthur FC even though they both have the same total competition points (28).

Appendix 4 – Weekly fixture view for the Fixtures page (default view)

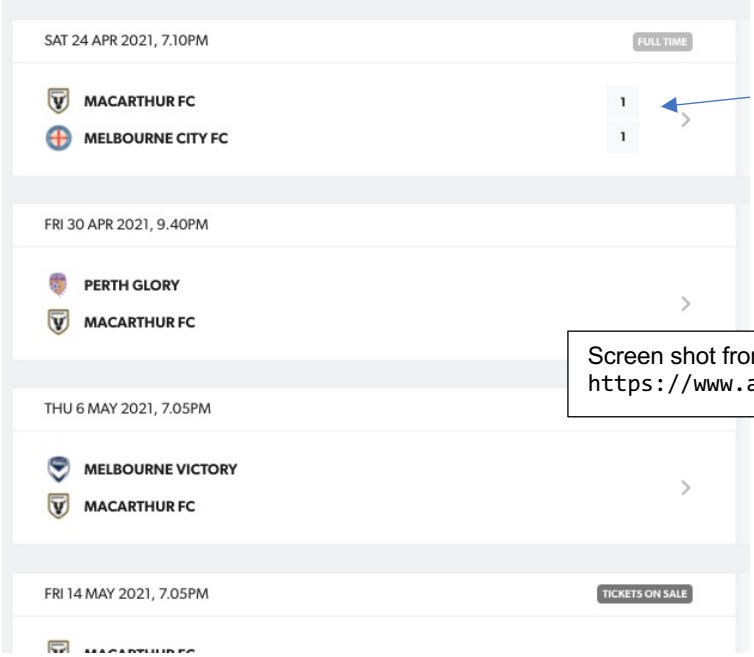


This **example** output shows the weekly fixture view for Fixtures. It displays all fixtures for the **current week** (the current week at the date of creating this document was Week 18) or can be used to display all fixtures for a chosen week.

Screen shot from
`https://www.a-league.com.au/fixtures#!/fixtures/s2020/r18`

Appendix 5 – Team fixture view for the Fixtures page

This example output shows all fixtures for Macarthur FC starting from Week 18 (the current week at the date of creating this document).

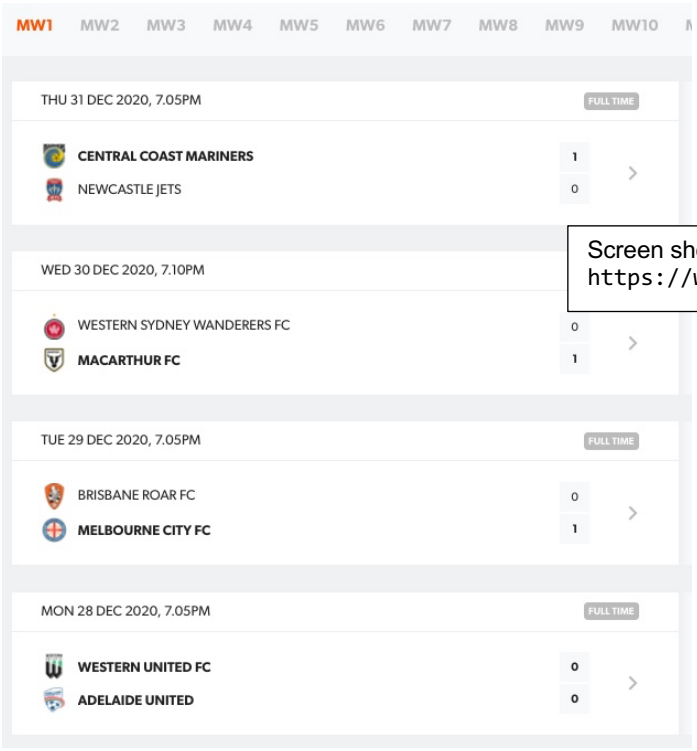


Match scores are displayed for completed weeks.

Screen shot from
https://www.a-league.com.au/fixtures#!/fixtures/s2020/t15049

Appendix 6 – Weekly fixture view for the Fixtures page (chosen week)

This **example** output shows the weekly fixture view for Fixtures. It displays all fixtures for the **chosen week**.



Screen shot from
https://www.a-league.com.au/fixtures#!/results/s2020/r1

Appendix 7 – A-League2021 Data Dictionary

The A-League2021 database consists of 5 tables. Each table is described below. You have been provided with your own copy of the A-League2021 database. A description of how to connect to the database is given at the end of this document.

Table Name: *teams*

This table contains details of all the teams in the 2020/21 A-League competition. Each row within this table represents an A-League team.
Your database credentials will only have **Select** and **Update** privileges for this table.

Field Name	Data Type	Null	Default	Description
teamID	INT	no	Auto increment	unique identifier for the A-League team
teamName	VARCHAR	no		the name of the A-League team
nickname	VARCHAR	yes	NULL	the commonly used nickname of the A-League team
emblem	VARCHAR	no		the path information for an image that is used as the team emblem
venueID	INT	no		the Venue ID of the sports ground where the A-League team play their home games
played	INT	no	0	number of matches played to date
won	INT	no	0	Number of matches won to date
lost	INT	no	0	Number of matches lost to date
drawn	INT	no	0	Number of matches drawn to date
goalsFor	INT	no	0	Accumulated goals scored by the team
goalsAgainst	INT	no	0	Accumulated goals scored against the team
goalDiff	INT	no	0	goal differential: GD = GF – GA, explained in Appendix 3
points	INT	no	0	Total competition points to date – accumulating points is explained in Appendix 2

Table Name: *venues*

This table contains details of the venues where matches are played. Each row in this table represents a venue. More than one team may use a venue as their home ground.
Your database credentials will only have **Select** privileges for this table.

Field Name	Data Type	Null	Default	Description
venueID	INT	no	Auto increment	unique identifier for the venue where matches are played
venueName	VARCHAR	no		the name of the sports venue
address	VARCHAR	yes	NULL	Street address for the sports venue
latitude	VARCHAR	yes	NULL	the latitude of the venue (used for Google Maps)
longitude	VARCHAR	yes	NULL	the longitude of the venue (used for Google Maps)

Table Name: *weeks*

This table contains the details of each week in the competition. Each row within the table represents a single week.
Your database credentials will only have **Select** privileges for this table.

Field Name	Data Type	Null	Default	Description
weekID	INT	no	Auto increment	unique numeric identifier for the week
startDate	DATE	no		Date of the first match in the week
endDate	DATE	no		Date of the last match in the week
matches	INT	no		the number of matches in the week

Table Name: ***fixtures***

This table contains the details of all matches (fixture/game) for each week of the A-League competition. This information is generated by the A-League prior to the start of the competition hence the results of each match are not known at the time this fixtures table is created. Each row within the table represents a match (fixture/game).
Your database credentials will have **Select** and **Update** privileges for this table.

Field Name	Data Type	Null	Default	Description
matchID	INT	no	Auto increment	Unique identifier for match/fixture
weekID	INT	no		The week in which the match is played
homeTeam	INT	no		Team ID for the home team
awayTeam	INT	no		Team ID for the away team
venueID	INT	no		Venue ID for where the match is being played (*normally* this will be the Home Team's home venue)
matchDate	DATE	no		Date of the match
matchTime	TIME	no		Kick off (start) time for the match
score1	INT	yes	NULL	score of home team for the match
score2	INT	yes	NULL	score of away team for the match

Table Name: ***leagueAdmin***

This table contains the login details of each A-League administrator. It provides their personal information, and login credentials (`username` and `password`).
Your database credentials will only have **Select** privileges for this table.

Note: passwords are encrypted using the **sha256** algorithm. For testing purposes, the plain text passwords are given in the **Admin Credentials** in appendix 8.

Field Name	Data Type	Null	Default	Description
id	INT	no	Auto increment	unique numeric identifier
email	VARCHAR	no		the administrator email address (also the username)
password	VARCHAR	no		the administrator **hashed** password
firstname	VARCHAR	no		Administrator first name
surname	VARCHAR	no		Administrator family name

Appendix 8 – Connecting to your A-League2021 Database

You have been provided with your own copy of the A-League2021 database on the TWA server. To access this database, you need to use a username and password. The following generic connection information can be used to connect to your A-League2021 database from your php scripts:

Database name: A_League2021_**###**
Username: twa**###**
Password: twa**###XX**
Server: localhost

where **###** is your twa site **number**, and **XX** refers to the **first two** characters of your twa site password.

For example, if your TWA site is twa**999**, and your password is **ab**cd7890, then the following would be your connection information:
Database name: A_League2021_**999**
Username: twa**999**
Password: twa**999ab**
Server: localhost

Hence, to connect to the A_League2021_999 database from your php script you would require code similar to:

```
$dbConn = new mysqli('localhost', 'twa999', 'twa999ab', 'A_League2021_999');
if ($dbConn->connect_error) {
    die('Connection error (' . $dbConn->connect_errno . ')'
    . $dbConn->connect_error);
}
```

Note: The tables within the database already have data but some will need to be updated as the semester progresses (i.e., as match results become known). Use the supplied `allTables.php` script to view the data (make sure you use the connection information as indicated above).

Appendix 9 – Administrator Credentials for A-league2021 web application

The passwords stored in the **password** field of the **leagueAdmin** table are encrypted using the sha256 algorithm. Below are the plain text passwords for these users so that you can test your login script.

Admin username (email)	Plain text password
fred@football.com	fred
bob@football.com	bob
harry@football.com	notharry