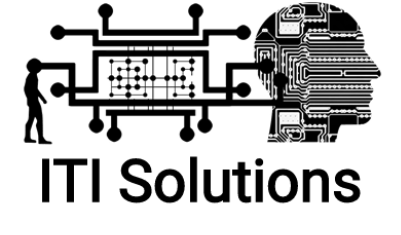
1/25/2020

Milestone 6

Data Design



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Edenbridge Family Services

Scheduling and Time-Tracking Database

Software: Schedule ED

Table of Contents

[Current System 1](#_Toc30885740)

[Business Rules 1](#_Toc30885741)

[Data Dictionary 1](#_Toc30885742)

[Entity Relationship Diagram 8](#_Toc30885743)

[Tables 9](#_Toc30885744)

[Shift 9](#_Toc30885745)

[Business Rules 9](#_Toc30885746)

[Shift Type 10](#_Toc30885747)

[Business Rules 10](#_Toc30885748)

[Shift Status 10](#_Toc30885749)

[Business Rules 10](#_Toc30885750)

[Department 11](#_Toc30885751)

[Business Rules 11](#_Toc30885752)

[Client 12](#_Toc30885753)

[Business Rules 12](#_Toc30885754)

[Group Home 13](#_Toc30885755)

[Business Rules 13](#_Toc30885756)

[Worker 14](#_Toc30885757)

[Business Rules 14](#_Toc30885758)

[User Type 15](#_Toc30885759)

[Business Rules 15](#_Toc30885760)

[Backup, Restoration, & Archival 16](#_Toc30885761)

[Backup 16](#_Toc30885762)

[Restoration 16](#_Toc30885763)

[Archival Operations 16](#_Toc30885764)

[Lessons Learned 17](#_Toc30885765)

# Current System

The system that has been requested for us to replace at Edenbridge is a mixture of paper forms and Microsoft Excel spreadsheets. In short, this system contains some mass inefficiencies that drastically lower the potential productivity at Edenbridge. Below is the general data structure that will be replaced.

A screenshot of a cell phone screen with text

Description automatically generated

Currently, Edenbridge uses a paper-based system in multiple binders shared between the coordinators. This makes it difficult to make sure the workers are not working overtime or being paid for work they have not done because the coordinators need to physically go over to the other coordinators’ binders and look at what shifts the workers already have.

## Business Rules

* One group home can house many clients
* One client can live in up to one group home
* One client can have many shifts
* One shift is for one client
* One worker can work many shifts
* One shift is worked by one worker
* One department can classify many shifts
* One shift is classified into one department

# Data Dictionary

| Table | Field Name | Description | Data Type | Data Format | Field Size | Required | PK or FK | FK Reference Table | Example |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SHIFT | SHIFT\_ID | ID number used to uniquely identify a shift. | INT | --- | 20 | Y | PK |  | 1234 |
|  | STATUS\_CODE | Code used to uniquely identify the status of a shift. | VARCHAR | --- | 3 | Y | FK | SHIFT\_STATUS | C |
|  | TYPE\_CODE | Code used to uniquely identify the type of shift. | VARCHAR | --- | 3 | Y | FK | SHIFT\_TYPE | GHD |
|  | CLIENT\_ID | ID number used to uniquely identify a client. | INT | --- | 20 | Y | FK | CLIENT | 1234 |
|  | WORKER\_ID | ID number used to uniquely identify a worker. | INT | --- | 20 | Y | FK | WORKER | 1234 |
|  | DEPT\_CODE | Code used to uniquely identify a department. | VARCHAR | --- | 3 | Y | FK | DEPARTMENT | PRI |
|  | SHIFT\_DATE | The date of a shift. | DATE | YYYY-MM-DD | 9 | Y |  |  | 1975-10-10 |
|  | SCHEDULED\_START | The time of day a shift has been scheduled to start | TIME | HH:MM | 8 | Y |  |  | 00:24 |
|  | SCHEDULED\_END | The time of day a shift has been scheduled to end. | TIME | HH:MM | 8 | Y |  |  | 00:24 |
| SHIFT | CLAIMED\_START | The time of day a worker claimed to start a shift. | TIME | HH:MM | 8 | Y |  |  | 00:24 |
|  | CLAIMED\_END | The time of day a worker claimed to end a shift. | TIME | HH:MM | 8 | Y |  |  | 00:24 |
|  | APPROVED\_START | The time of day the shift started after being confirmed. | TIME | HH:MM | 8 | Y |  |  | 00:24 |
|  | APPROVED\_END | The time of day the shift ended after being confirmed. | TIME | HH:MM | 8 | Y |  |  | 00:24 |
|  | SUPERVISOR | Boolean variable showing if the worker is the supervisor for that shift | TINYINT | 0/1 | 1 | Y |  |  | 0 |
|  | SHIFT\_KM | Distance travelled by worker for the shift, not always applicable | INT | ---km | 3 | N |  |  | 50km |
|  | SHIFT\_NOTES | Any extra information necessary for the person working the shift. | LONGTEXT | --- | 150 | N |  |  | Some specific thing to take into consideration. |
| SHIFT\_TYPE | TYPE\_CODE | Code used to uniquely identify the type of shift. | VARCHAR | --- | 3 | Y | PK |  | GHD |
| SHIFT\_TYPE | TYPE\_NAME | Name of the type of shift | VARCHAR | --- | 20 | Y |  |  | Group home day |
| SHIFT\_STATUS | STATUS\_CODE | Code used to uniquely identify the status of a shift. | VARCHAR | --- | 3 | Y | PK |  | S |
|  | STATUS\_NAME | Name of a shift’s status. | VARCHAR | --------------------------- | 20 | Y |  |  | Scheduled |
| DEPARTMENT | DEPT\_CODE | Code used to uniquely identify a department. | VARCHAR | --- | 3 | Y | PK |  | PRI |
|  | DEPT\_NAME | Name of a department. | VARCHAR | --------------------------- | 20 | Y |  |  | Private |
|  | DEPT\_DESC | Description of a department | VARCHAR | ---------------------------- | 50 | Y |  |  | Children department is for working with children |
| CLIENT | CLIENT\_ID | ID number used to uniquely identify a client. | INT | --- | 20 | Y | PK |  | 1234 |
|  | GH\_ID | ID number used to uniquely identify a group home. | INT | --- | 20 | Y | FK | GROUP\_HOME | 1234 |
|  | CLIENT\_FNAME | The last name of a client. | VARCHAR | --------------------------- | 20 | Y |  |  | William |
|  | CLIENT\_LNAME | The first name of a client. | VARCHAR | --- | 20 | Y |  |  | Picard |
| CLIENT | CLIENT\_ADDRESS | The address of a client. | VARCHAR | --------------------------- | 40 | Y |  |  | 1234 Street St. |
|  | CLIENT\_CITY | The settlement a client lives in. | VARCHAR | #-###-###-#### | 20 | Y |  |  | 1-123-123-1234 |
|  | CLIENT\_PH1 | Primary phone number of a client. | VARCHAR | #-###-###-#### | 14 | Y |  |  | 1-123-123-1234 |
|  | CLIENT\_PH2 | Secondary phone number of a client. | VARCHAR | #-###-###-#### | 14 | N |  |  | 1-123-123-1234 |
|  | CLIENT\_EPH | Emergency phone number of a client. | VARCHAR | #-###-###-#### | 14 | N |  |  | 1-123-123-1234 |
|  | CLIGUARD\_NAME | Name of a client’s guardian. | VARCHAR | --------------------------- | 20 | N |  |  | Jean |
|  | CLIGUARD\_PH1 | Primary phone number of a client’s guardian. | VARCHAR | #-###-###-#### | 14 | N |  |  | 1-123-123-1234 |
|  | CLIGUARD\_PH2 | Secondary phone number of a client’s guardian. | VARCHAR | #-###-###-#### | 14 | N |  |  | 1-123-123-1234 |
|  | CLIENT\_ACTIVE | Whether the client is being actively served. | TINYINT | 0/1 | 1 | Y |  |  | 0 |
|  | CLIENT\_MAX\_HOURS | Maximum number of hours that can be allocated to client. | FLOAT | ##.## | 4 | N |  |  | 56.75 |
| CLIENT | CLIENT\_NOTES | Any extra information about the client. | LONGTEXT | --------------------------- | 150 | N |  |  | Some specific thing to take into consideration. |
| GROUP\_HOME | GH\_ID | ID number used to uniquely identify a group home. | INT | --------------------------- | 20 | Y | PK |  | 1234 |
|  | GH\_ADDRESS | The address of a group home. | VARCHAR | --------------------------- | 40 | Y |  |  | 1234 Street St. |
|  | GH\_PHONE | The phone number of a group home. | VARCHAR | #-###-###-#### | 14 | Y |  |  | 1-123-123-1234 |
| WORKER | WORKER\_ID | ID number used to uniquely identify a worker. | INT | --------------------------- | 20 | Y | PK |  | 1234 |
|  | USER\_TYPE\_CODE | The code to identify what type of user an employee is | VARCHAR | - | 1 | Y | FK | USER\_TYPE | W |
|  | USER\_PASS | The user password for the employee | VARCHAR | ------------------------------- | 30 | Y |  |  | Password1 |
|  | WORKER\_FNAME | The first name of a worker. | VARCHAR | --------------------------- | 20 | Y |  |  | Jane |
|  | WORKER\_LNAME | The last name of a worker. | VARCHAR | --------------------------- | 20 | Y |  |  | Smith |
| WORKER | WORKER\_PH1 | Primary phone number of a worker. | VARCHAR | #-###-###-#### | 20 | Y |  |  | 1-123-123-1234 |
|  | WORKER\_PH2 | Secondary phone number of a worker. | VARCHAR | #-###-###-#### | 20 | N |  |  | 1-123-123-1234 |
|  | WORKER\_EPH | Emergency phone number of a worker. | VARCHAR | #-###-###-#### | 20 | N |  |  | 1-123-123-1234 |
|  | WORKER\_ADDRESS | A worker’s address. | VARCHAR | --------------------------- | 40 | Y |  |  | 1234 Street St. |
|  | WORKER\_CITY | The settlement a worker lives in. | VARCHAR | --------------------------- | 20 | Y |  |  | Settleville |
|  | CAN\_GH | Whether a worker can work in a group home or not. | TINYINT | 0/1 | 1 | Y |  |  | 1 |
|  | CAN\_DRIVE | Shows if a worker can drive for work. | TINYINT | 0/1 | 1 | Y |  |  | 1 |
|  | WORKER\_ACTIVE | Whether the worker is actively working for the company. | TINYINT | 0/1 | 1 | Y |  |  | 1 |
|  | WORKER\_AVAIL | The worker’s current availability. | VARCHAR | --------------------------- | 50 | Y |  |  | 8:00-15:00, Monday-Friday |
|  | WORKER\_NOTES | Any extra information about the worker. | LONGTEXT | -------------------------- | 150 | N |  |  | Some specific thing to take into consideration. |
| USER\_TYPE | USER\_TYPE\_CODE | Code used to uniquely identify a user’s type | VARCHAR | - | 1 | Y | PK |  | W |
|  | USER\_TYPE\_NAME | Name of the user’s type | VARCHAR | ---------------- | 10 | Y |  |  | Worker |

# Entity Relationship Diagram

A screenshot of a computer

Description automatically generated

This diagram gives an overall picture of the database design for the proposed system. The main tables are the shift, worker, and client tables with a few other tables that are primarily used as lookup tables for the shift table. Such tables include the shift type, shift status, and department tables. With the utilization of primary and foreign keys, it will become easier than using the current system to find information about different shifts, as well as the workers and clients that are a part of those shifts.

# Tables

## Shift

A screenshot of a cell phone

Description automatically generated

The shift table is the most important table in the database, storing all the information about the work done by the workers. This table is linked to most of the other tables, using data from all of them to display information about each shift worked. The information stored in a record in the shift table is relevant to most any shift that would be scheduled.

### Business Rules

* Many shifts can be for one client
* Many shifts can be worked by one worker
* Many shifts can be categorized by one shift type
* Many shifts can by classified into one department
* Many shifts can be described by one shift status

## Shift Type

A screenshot of a cell phone

Description automatically generated

The shift type table is used to describe shifts in more detail, indicating whether a shift has special factors such as being an overnight shift.

### Business Rules

* One shift type can categorize many shifts
* One shift is categorized by one shift type

## Shift Status

A screenshot of a cell phone

Description automatically generated

The shift status table stores the information for the different shift statuses such as scheduled, completed, or approved. The status of a shift will change from when it is scheduled to after it is worked, indicating whether the worker assigned to the shift can get paid or not.

### Business Rules

* One shift status can describe many shifts
* One shift is described by one shift status

## Department

A screenshot of a video game

Description automatically generated

The department table stores information about the different department that shifts are classified into, such as children, CTO, or PDO. It also includes a more detailed description of the department if necessary. Keeping track of a shift’s department is essential for bookkeeping purposes, as different departments have different rates of pay.

### Business Rules

* One department can classify many shifts
* One shift is classified into one department

## Client

A screenshot of a cell phone

Description automatically generated

The client table stores information about Edenbridge’s clients, including their name, phone number, and the contact information for their guardian. One of the most important fields is the max hours, which allows the coordinators to see how many hours the client can be scheduled for, typically on a monthly basis.

### Business Rules

* One client can have many shifts
* One shift is for one client
* Many clients can live in one group home
* One client may live in one group home at most

## Group Home

A screenshot of a cell phone

Description automatically generated

The group home table stores basic information about Edenbridge’s group homes, including a blank record with an ID of 0 that can be linked to clients who do not live in a group home.

### Business Rules

* A group home can house many clients
* One client may live in one group home at most

## Worker

A screenshot of a cell phone

Description automatically generated

The worker table stores information about the workers themselves, including their name, phone number, and whether they can drive or work in a group home. It also stores their user information, including the password they use to log in to the system and the type of user they are. Another important field in this table is the worker’s availability, which the coordinators will be able to check to know when they are available to work.

### Business Rules

* One worker can work many shifts
* One shift is worked by one worker
* One worker has one user type
* One user type applies to many users

## User Type

A picture containing screenshot

Description automatically generated

The user type table is used to store the information for different classifications of users. Each employee will have a user account that will allow them to log in to the application, as well as a user type that will determine what interface they will be able to see when they log in. For example, a user with a worker type will be able to view their schedule and submit the hours they have worked, whereas a user with the coordinator type will be able to schedule workers and review submitted hours.

### Business Rules

* One user type can apply to many workers
* One worker has one user type

# Backup, Restoration, & Archival

## Backup

In order to reduce the risk of data loss and ensure data can be restored easily, system backups are a necessity. For organizations like Edenbridge where new information is being created and accessed every day, regular backups are especially vital.

For our system, backups will be done regularly with a backup process being executed once per day locally. This will be done automatically by utilizing the “cron” utility in Linux, which is a utility that allows jobs to be run at certain times or intervals, to schedule a “mysqldump” event once every day at a time with low server activity. This will “dump” the contents of the database by saving a file with a set of MySQL statements that can be used to rebuild the database if anything happens to it. We will also be taking advantage of Altis' current backup plan with Edenbridge in which they back up the data from Edenbridge’s server twice per day. We can take advantage of this by sending the backups to the server located in their office with SFTP. In addition to local backups, A2 Hosting, which is Edenbridge’s web hosting service company, performs regular off-site backups to ensure that the system itself is not compromised. As a last resort, we will also provide Edenbridge with copies of all the source code for the system so that even if some kind of catastrophe were to occur, the system could be restored to the condition it was in when it was first implemented.

## Restoration

The data restoration process would be executed in the event irreparable damage has been done to the structure of the database, the data contained therein, or in the event of data loss by the host. The data that would be restored in such an instance is that of the latest verified backup.

The process of restoration would involve using the host’s backup if it is available. In the event that this is not an option, we will use the file created by the “mysqldump” from one of our backups. This file can be run on the MySQL server to restore the database to the same state it was in when the data was dumped.

## Archival Operations

Before planning an archival strategy, it needs to be determined whether it is necessary. In many databases, older data must be archived so that the system’s performance is not heavily impacted. However, this system is relatively small and will not be producing an immense number of records. Most of the records the system will produce are shift records, so they would be the only real consideration when determining the size of the database. Assuming an average of 200 shifts are worked every day with an average size of 250 bytes per shift record, the amount of data produced in one year would be approximately 18,250,000 bytes, or around 18 megabytes. Realistically, most records would be even smaller than 250 bytes, so the actual amount of data would be much smaller. Regardless, the amount of data produced by the system is almost negligible compared to the size of most storage devices.

With the relatively small amount of records that will be produced by this system, the performance of the database should not suffer even with years of records, meaning we can avoid archiving data completely. If the size of the database ever became an issue in the future due to significant growth in the organization, a sufficiently knowledgeable and skilled IT professional could add this functionality to the system.

# Lessons Learned

| Date | Submitted By | Milestone | Experience | Lesson | Lesson Type | Effect | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Jan. 25, 2020 | Beryon | Milestone 6 | To be slightly off topic, very much dislike being sick like I have been for the last two weeks. More on topic, found the importance of ensuring that we have everything we need to know in order, like with archiving. | I now know the importance of keeping everything in order, and to ensure that we remain knowledgeable about the tools we intend to use. On the cold front, to be a little more proactive in damage control. | Personal/Academic | Going forwards, planning on looking a little more critically at what we are planning and evaluating if specific aspects absolutely must be implemented. Should help guard against feature creep. Also, buying hand sanitizer. | |
| Jan. 24, 2020 | Justin | Milestone 6 | After spending a lot of time on devising an archival plan, we realized it is not necessary | Consider whether or not something is necessary before deciding to implement it, especially if it would require a lot of extra work. | Academic | From now on, we will determine if any potential additions to our system are actually necessary before planning how to implement them. | |
| Jan. 17, 2020 | Harley | Milestone 6 | Information I relayed to the team from external sources was misinterpreted. | I must be as clear as possible leaving absolutely no ambiguity in my messages.  Otherwise, it is likely that occasionally, people will  not understand what I am saying. | Personal | I will attempt to communicate in a way that does not allow for alternate interpretation. Clarifying all details of what I am saying should help. | |
| Dec. 2, 2019 | Justin | Milestone 5 | By getting a head start on some projects, I was able to finish them early, giving me more time to focus on more important things, like the Systems assignments. | Get a head start on assignments, do not start working on things the day before they are due. | Academic | From now on, I will try harder to start working on things sooner, as I enjoy not having to stress about finishing assignments a few hours before they are due (except when milestone documents are due apparently). | |
| Dec. 2, 2019 | Beryon | Milestone 5 | Overly broad? Maybe. End of this milestone, I feel like I have a shockingly concise view about how this system will look at the end of it. The little technical details are coming together in my head enough to visualize it. | The entire waterfall process we’ve gone through so far has been especially helpful to be able to grasp how this system will come together. | Personal | Going into the second half of this project I feel far more confident about it. Enough so that I am starting to get a feel for how individual components would come together. This means that I can start building a framework to be able to run off of once we begin the related sections. | |
| Dec. 2, 2019 | Harley | Milestone 5 | Overestimated the cost of the project | Professionals would be significantly more experienced, which would allow them to achieve the same thing we are in a third of the time or less. | Personal | I will spend more of my spare time working on programming projects to gain experience, and make it second nature for myself to complete the tasks involved in development. |
| Nov. 29, 2019 | Aidan | Milestone 5 | Wearing myself out with work and not letting myself have some time to sit down and rest | Next semester I will allow for an hour between school and work | Personal | This will give me some time to sit and rest between the two major things I need to do in a day | |
| Nov. 26,  2019 | Evan | Milestone  5 | Learning how project design works | I have no interest in making systems for a living | Personal | When I pursue a job in I.T. I will not choose one involving system design for outside sources. | |
| Nov. 18, 2019 | Evan | Milestone 4 | Having diminished cognitive activity due to 8am classes | I now know what it feels like to have Alzheimer's, it is an ungodly fate to anyone who develops it. | Personal | Will plan my next semester with 8am classes on alternating days. | |
| Nov. 18, 2019 | Beryon | Milestone 4 | Flash of inspiration coming from a different class, an idea to use Windows credentials to act as the login for the web portal. | Upon further reading, it appears possible to utilize existing Windows login credentials for logging into the site. | Technical | This is entirely subject to the existing structure and how the site is currently set up, as this segment of the system would depend heavily on the utilization of IIS. If it is utilized for the site, then we have our login system. Again, pending some questions though. | |
| Nov. 17, 2019 | Harley | Milestone 4 | I became acquainted with SQLyog. | SQLyog is a powerful GUI based tool for interfacing with MySQL. Previously I wrote scripts for everything I did with MySQL databases. | Technical | I should be able to create and modify databases a bit faster now that I have SQLyog. | |
| Nov. 14, 2019 | Aidan | Milestone 4 | I learned more about how php functions | Php does not remember where you are when it sends back the web page so you have to program it to save values that you want to manipulate later | Technical | This will help me to make the web app function and remember where the user is along the process | |
| Nov. 14, 2019 | Justin | Milestone 4 | I learned the basics of integrating databases into PHP, which will be essential for our app when it is developed. | Now that I know how to actually make everything connect, creating the web app actually seems like something that can be done. | Technical | Now that we know how to create the web app, we have an idea of how we can get it to work. | |
| Oct. 26, 2019 | Beryon | Milestone 3 | This may be similar to an earlier one I did but found out the designer aspects within the Office Suite is a fair deal more powerful than I initially expected, even with 5+ years of experience using it for educational things. | Design and layout aspects within Microsoft Office Suite has far more functionality than it initially looks like. | Technical | With this Milestone as can be observed, there’s a good deal more effort that I put into the presentation of the document and the layout such as with the table of contents which is almost automated with using the styles bar on the home tab. This knowledge will be carried forwards into not just other documents, but all files created during this project. | |
| Oct. 26, 2019 | Evan | Milestone 3 | Visio’s sharing policies are not as optimized as the rest of the office suite. At multiple times what was the newest version was unclear. | Don’t rely on Microsoft office to share and maintain files across users. | Personal | If Visio or a program similar is used in the future, a repository type program needs to be used. | |
| Oct. 24, 2019 | Aidan | Milestone 3 | Not knowing enough about the scheduling process and how it is going to function | Focusing too much on the extra details of the system and not asking questions about some essential parts of the scheduling system | Academic | I will try to look at the big picture more often to check if I am only looking at one part | |
| Oct. 24,  2019 | Harley | Milestone 3 | Received a poor grade on Milestone 2 | Proofreading everything extensively is very important to ensure the documentation is up to the standard expected of us. | Academic | I will now be aiding in the proofreading and revision going over the deliverables multiple times to ensure what we produce is high quality as much as I’m able to. | |
| Oct. 18, 2019 | Beryon | Milestone 3 | Lesson? Reminder? Whichever, finally sunk in that this is an actual system being developed. | Far more detail than what I was accustomed to doing with classwork is required for this systems project. | Personal | Going forwards, will be redoubling efforts to ensure every little detail with what we do to ensure that it not only fulfills the deliverable requirements, but also to whatever specification the client provides on an aspect. | |
| Oct. 17, 2019 | Justin | Milestone 3 | We started focusing too heavily on aspects of the project that were not very important | Focus on important things first, then think about extras later | Academic | From now on, we will focus on the functionality of the system, anything extra will only be considered after the basic requirements are met | |
| Oct. 11, 2019 | Beryon | Milestone 2 | Project has a substantial feature-set, most of which was previously unknown from the first couple times. | Learned a good amount about how to work Project, including different ways to set up tasks and organize them. | Technical | Going forwards, should be far easier to arrange events and plan things out via Project. As a side effect, there’s a measure of knowledge attained in how to potentially display events in the system being developed. | |
| Oct. 11, 2019 | Justin | Milestone 2 | Milestone presentation was not great, no intro or conclusion | Make sure assignments include all components | Academic | We will have a team member observe presentations from the other class to know what needs to be included for future presentations | |
| Oct 11,  2019 | Harley | Milestone 2 | Organization  of presentation  was not ideal. | The order in which the information is presented is very important if we want it to be easy to follow. | Academic. | Someone will be assigned the duty of analyzing the presentation to ensure the flow of information makes more sense. | |
| Oct 11,  2019 | Aidan | Milestone 2 | My work school balance was not great for the first month of school | I learned how far I can push myself before my school begins to suffer from it | Personal | Going forward I am not taking as much hours at work and am going to say no to more hours when asked so I can focus on this project | |