Contents

Analysis

1. Introduction

1.1 Client Identification

My client is Colin Piggott; he is 52 years old and has little experience with computers apart from performing basic tasks. Colin mainly uses a computer to surf the internet and send occasional emails. Currently Colin uses manual paper methods and his phone to undertake his work and uses his sons Custom built Asus desktop computer running a 64 bit version of windows 7 Ultimate edition to send the occasional emails.

Colin is a self-employed Heating Engineer who does various jobs/services in this area of work. These jobs can contain boiler servicing, heating fitting or repair and hired building checks for Estate agents. Colin works in the Cambridgeshire and Hertfordshire area mainly but expands depending on the job in hand. All jobs and documentation tasks are undertaken alone by Colin with occasional help from his wife (Carol Piggott) with some of the invoices and don't have any current plans to hire a business partner or colleague.

Colin would like to use a more computer bases system to increase the productivity and speed of his business. Currently it is hard to search for specific customer's details/ information and keeping all the data centralised. With the new system Colin would like to be able to keep all his customers in a database so that he could simply look them up instead of having to take down all the details multiple times on different occasions, and keep all this information linked to the invoices which could then be calculated and emailed to the customer when the job is completed.

1.2 Define the current system

The current system in place is a manual paper based system which involves Colin taking details from customers over the phone (or the occasional email) and recording it in a diary/planner. This information includes: the name, address and number of the customer, the type of job it is going to be (Estate agent hiring, servicing or if he is going to have to visit the customers house to find the problem), the date he will be doing the job and the time the job will be undertaken.

If parts are needed to undertake a repair or servicing Colin will then contact his supplier and order the required parts and take note of how much each part is going to cost. A quote is now calculated using the total price of the parts and how many hours Colin thinks it will take, plus a small amount to make a profit from the job. This is given to the customer, once agreed upon with the customer the job is undertaken and completed.

In the final stage of the current system Colin writes up an invoice on a printed 'Home Heat' invoice book listing the price parts, charge for the amount of hours, the vat percentage, a few details about the type of work undertaken and the date/ time he undertook the work. This is then copied and one given to the customer and one kept in Colin's records. Currently Colin's records are folders labelled by month which contain the invoice book(s) from that month.

1.3 Describe the problems

There are quite a few problems with the current system; firstly when an existing customer rings up it is very hard to find the customers details because he has to go through the entire Appointment Book, which means finding the address of an existing customer for example isn't often a viable option, which means that he has to record all their data again which could cause inconsistencies in their details. This creates a lot of data that is often identical but stored in multiple places, this takes up a lot of physical space, wastes resources and Colin/ the customers time. By having such a large amount of information stored physically the risk of data loss is very high

due to paper documents easily being damaged/lost when moving them or if an uncontrollable event happens, such as a fire. One last problem is that the data is not currently stored in a safe or other locked deposit box/cabinet apart from the door to Colin's house being locked. This means that data on customers could easily be stolen if someone was to break into the house.

1.4 Section appendix

Tom Piggott Candidate Number: 0731 Centre Number: 22151

Interview Questions

1. What is the current system?

- Paper based
- Get client data from phone
- write in appointment book
- Calculate quote
- undertake job
- Calculate invoice
- copy of invoice stored in file

2. What are the problems with the current system?

easy to lose client data
no exsisting client data stored
invoice records take up alot of space

3. What data is recorded at present?

- Client Name, address, phone no.
- job Type, details, date, time

4. How much of this is stored and reused for existing clients?

None for clients only invoice copys kept
Appointment book stored when full but not used to l
up exsisting clients.

5. How many clients do you work for on a day to day basis?

- usually 2-4

6. How many of these are existing clients?

- Varies alot
- can be all 2-4 or none

7. What should the new system achieve?

- store all client data
- store all job history
- link jobs to clients
- automatic invoicing (extra if

8. Is any part of the system going to stay the same?

- Phoning clients to get their data

9. How often will new data need to be input into the system?

Several times a day

10. How long will this data stay in the system?

- If storage capacity becomes a problem then 6 months
- If no capacity problems - as long as company is still running

11. Will hard copies need to be printed from the data?

- if client has no email then yes to print invoice.

12. How many people will be using the proposed system?

- Only 1 - Colin

13. If secondary accounts are to be made on the system what access rights should they have?

- No secondary accounts.
- If one was added - ~~full~~ No Client data editing otherwise - full access.

14. What computer resources will the system have available to run on?

- Sons computer
- 64 bit Windows 7 Ultimate
- 3.3 GHz Quad core CPU
- 8 GB DDR3 Ram
- 1.5 TB HDD
- 19" Display

15. What software (operating system) is the available computer running?

- 64 bit Windows 7 Ultimate edition

16. Is buying/installing additional software/hardware an issue?

- would prefer not to install new software (OS) due to it being Sons computer.
- no buying issue.

17. Is there any additional tasks you would like the proposed system to undertake?

- Backup utilities
- Automatic Invoicing

I answered these questions to aid Thomas Piggott with analysing my current system and to aid in the design/creation needs of his proposed system.

Signed: C. Piggott

2. Investigation

2.1 The current system

2.1.1 Data sources and destinations

In the current system there are three main data sources that used - the client, the Supply Company and visiting the customers address, this data is often repeated on multiple documents. When a customer needs help with the heating/ boiler they will either ring Colin's mobile/ house phone and leave a message if he is busy or speak to him directly (occasionally Colin will receive emails but this is not very often compared to phone calls). The required data is then recorded into Colin's appointment book. Once the parts required for the job are known they are noted down in Colin's book, this data is then passed to the supply company over the phone who gives back a total price for everything needed.

Now the first output of the system is created – the quote. This data is then seen by the customer and agreed upon. The work is now undertaken and completed, prompting the second output of the system – the invoice which is then also transferred to the customer who then uses that data to pay Colin. Finally the copy of the invoice is stored.

Source	Data	Example Data	Destination
Client	First name, Last name, Addr1, Addr2, Addr3, Addr4, Postcode, Phone number, EmailAddr, job type/problem	John Smith, 10 Example Road, Cambridge, 01223 123456, Servicing	Engineer
Visiting the property (If needed)	Problem/ Repair needed, specific details (if needed)	Boiler replacement, Model No: 1657	Appointment Book
Engineer	First name, Last name, Addr1, Addr2, Addr3, Addr4, Postcode, Phone number, EmailAddr, job type/problem & job details	John Smith, 10 Example Road, Cambridge, 01223 123456, Servicing, Model No: 1657	Appointment Book
Engineer	Specific parts needed	Boiler of Model No: 1657	Supply Company
Supply Company	Cost of individual parts	Boiler = £120	Appointment Book
Engineer	Total price & date to undertake work	£200, 13/06/2012	Client
Engineer	Total price, broken down prices, vat %, date undertaken, other details	£200, Boiler = £120, 20%, 13/06/2012, next service needed on 13/12/2012	Client

2.1.2 Algorithms

In the current system this is only three simple Algorithms being used. One is checking whether the Client has accepted the amount on the quote. Another is checking whether the work is fully completed and then creating/ sending an invoice, and lastly checking if the Client has paid.

Checking whether the Client is happy with the quoted amount:

$Agreed \leftarrow False$

$WHILE\ (Agreed = False) DO$

$IF (Client\ is\ unhappy\ with\ quote) THEN$

$Discuss\ and\ change\ qoute$

$ELSE$

$Agreed \leftarrow True$

$Start\ work$

$END\ IF$

$END\ WHILE$

The next algorithm is to check if the work is fully complete:

$Finished \leftarrow False$

$WHILE (Finished = False) DO$

$IF (Problem\ is\ not\ fixed) THEN$

$Diagnose\ current\ problem$

$Fix\ Problem$

$ELSE$

$Finished \leftarrow True$

$END\ IF$

$END\ WHILE$

$Create\ Invoice\ sheet$

$Send\ Invoice\ sheet\ to\ client$

The final algorithm is to check if the Client has paid the invoice:

$Invoice\ Sent\ \leftarrow True$

$Money\ Received\ \leftarrow False$

$WHILE(Money\ Received = False)DO$

    $Contact\ Client$

    $IF(Client\ has\ paid\ and\ Money\ Received = False)THEN$

        $Contact\ Bank$

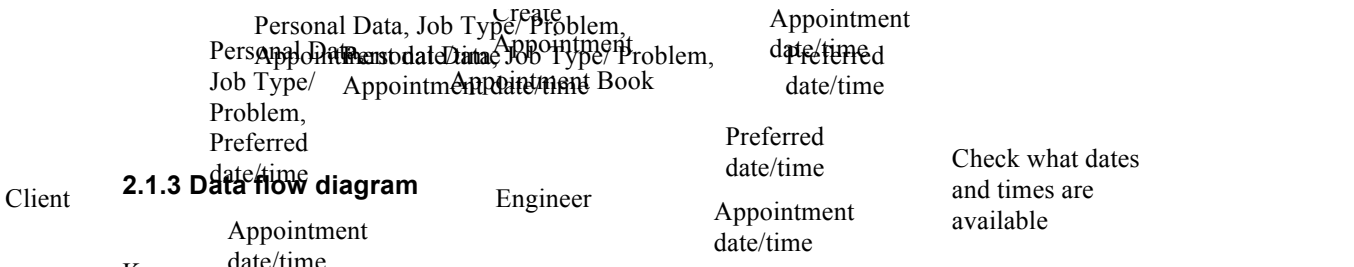
        $Reorganise\ Payment\ with\ Client$

    $ELSE$

        $Money\ Received \leftarrow True$

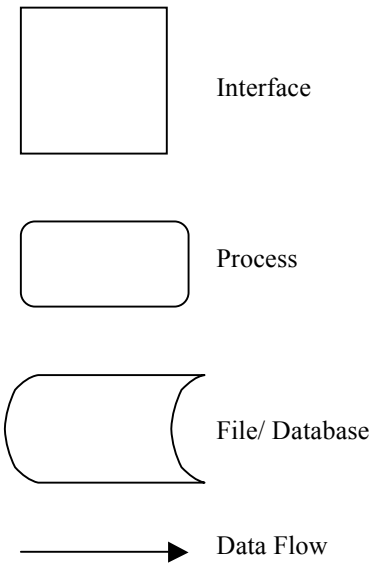
    $END\ IF$

$END\ WHILE$

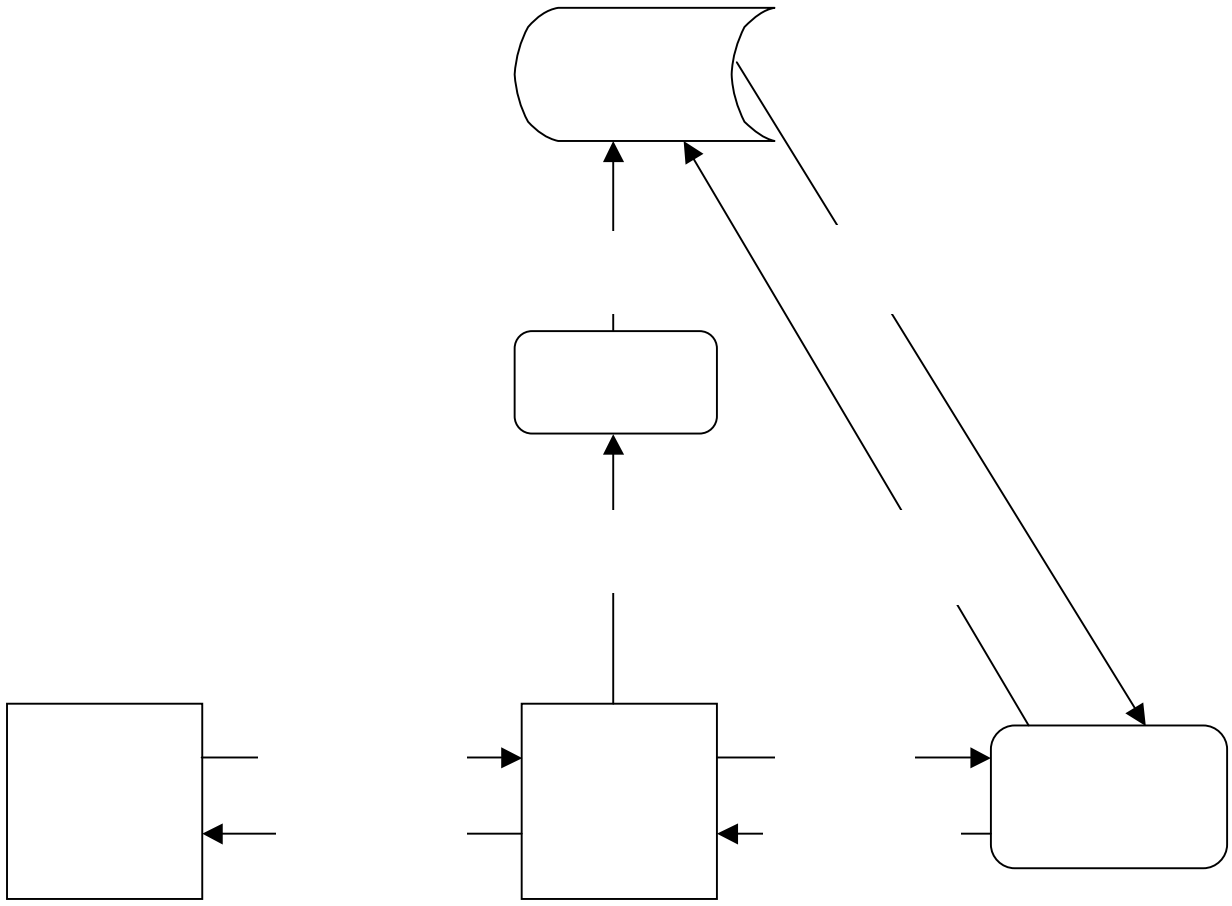


2.1.3 Data flow diagram

Key:



Adding a new customer/ booking to the Appointment book:



gineer

Tomorrow's Appointments

Today's Date

Parts Database

Appointment Book

Tomorrow's Date

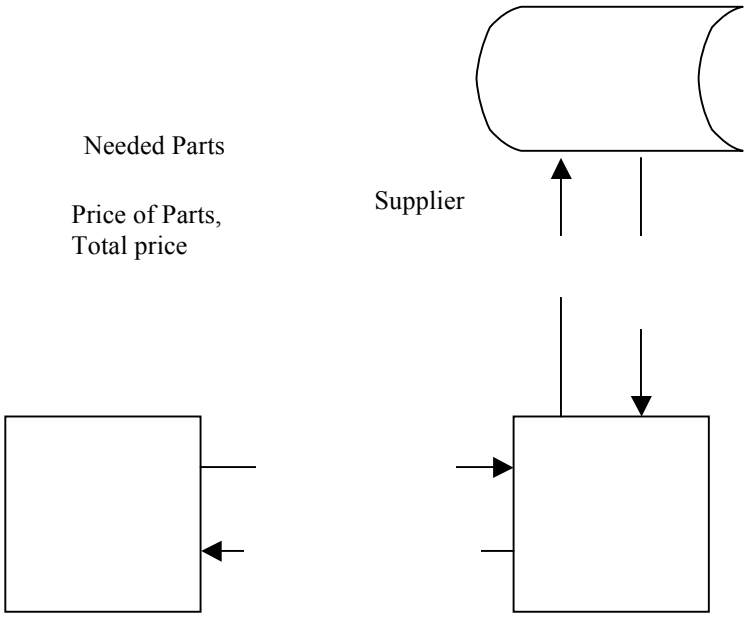
Appointment Book

gineer

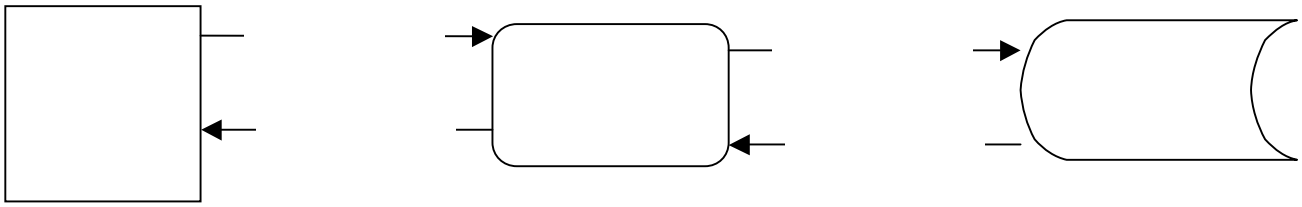
Tomorrow's Appointments

Getting the price of parts from the supplier:

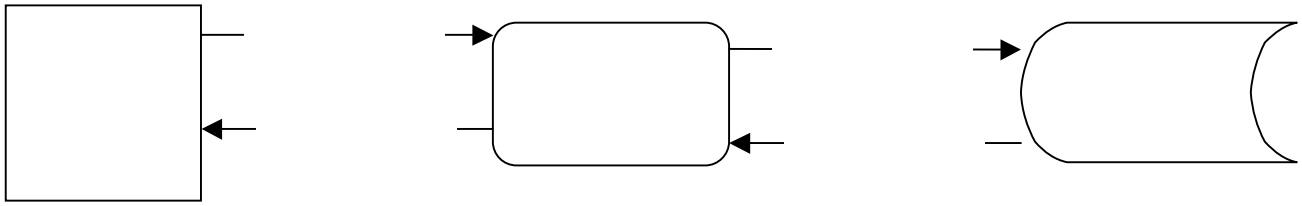
Needed Parts Price of Parts



Start of the day routine:



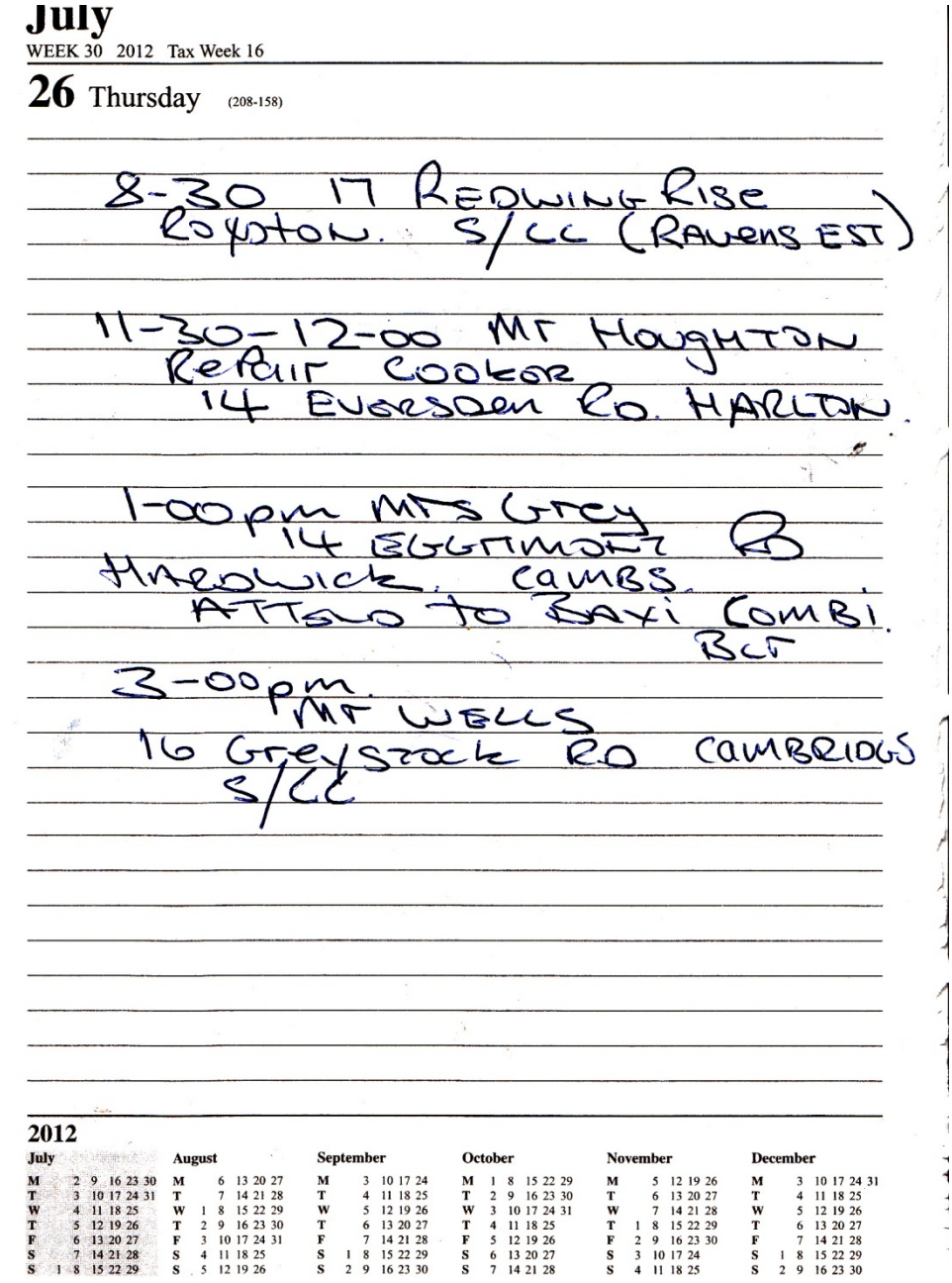
End of the day routine:



2.1.4 Input forms, Output Forms, Report Formats

The current system has two input forms – Colin's Appointment book and the order form for the Supply Company. The current system also has three different output forms - the Quote form, the Invoice form and a Gas Safety Certificate form.

Below is a page scanned from Colin's Appointment Book it lists the details for the Client – Name and address, and a few details of the job. This is an input form. The "S/LL" on some of the appointments means Servicing/ Landlord; this is when Colin is hired by an Estate agent to service/ check the existing systems inside the house before it is resold/ rented.



July
WEEK 30 2012 Tax Week 16

26 Thursday (208-158)

8-30 17 REDWING RISE
ROYSTON. S/CC (RAVENS EST)

11-30-12-00 MR HAUGHTON
REPAIR COOKER
14 EVERSDEN RD. HARLTON.

1-00pm MRS GREY
14 EGGTHORPE
HARDWICK. CAMBS.
ATTEND TO BAXI COMBI.
BCT

3-00pm.
MR WELLS
16 GREYSTOCK RD CAMBRIDGE
S/CC

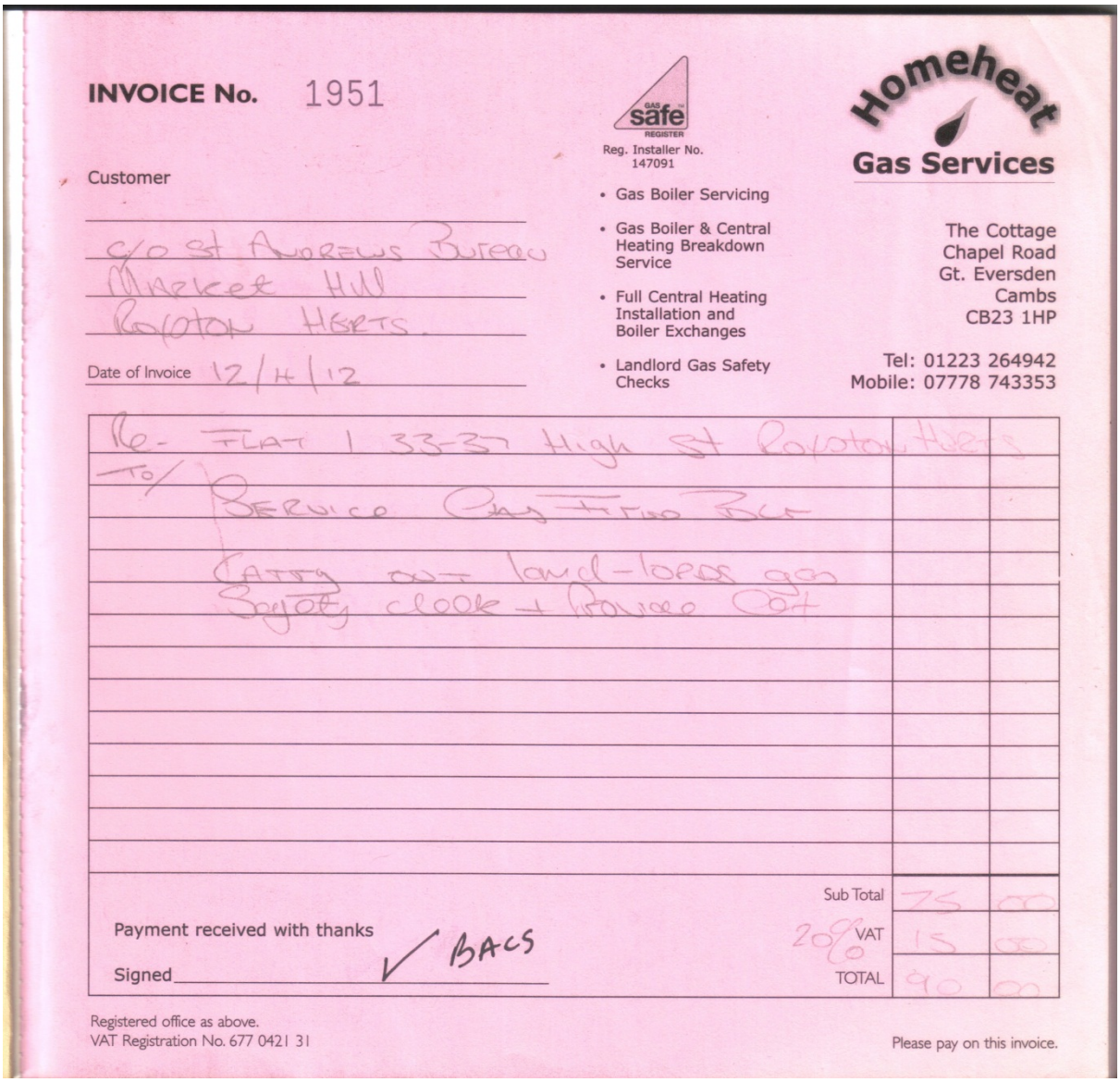
2012

July							August							September						
M	2	9	16	23	30		M		6	13	20	27		M	3	10	17	24		
T	3	10	17	24	31		T		7	14	21	28		T	4	11	18	25		
W	4	11	18	25			W	1	8	15	22	29		W	5	12	19	26		
T	5	12	19	26			T	2	9	16	23	30		T	6	13	20	27		
F	6	13	20	27			F	3	10	17	24	31		F	7	14	21	28		
S	7	14	21	28			S	4	11	18	25			S	1	8	15	22	29	
S	1	8	15	22	29		S	5	12	19	26			S	2	9	16	23	30	

October							November							December						
M	1	8	15	22	29		M		5	12	19	26		M	3	10	17	24	31	
T	2	9	16	23	30		T		6	13	20	27		T	4	11	18	25		
W	3	10	17	24	31		W		7	14	21	28		W	5	12	19	26		
T	4	11	18	25			T	1	8	15	22	29		T	6	13	20	27		
F	5	12	19	26			F	2	9	16	23	30		F	7	14	21	28		
S	6	13	20	27			S	3	10	17	24			S	1	8	15	22	29	
S	7	14	21	28			S	4	11	18	25			S	2	9	16	23	30	

Unfortunately this is the only input form Colin can supply me with as the Supply Company has them onsite and only gives Colin a receipt instead of a copy of the original order form.

Below is an example of an Invoice form, this is used to bill the customer with the final cost of the work undertaken and give a few additional details about what type of job was undertaken (e.g. Estate agent hire work). The word "BACS" at the bottom of the invoice means that the Client paid directly to Colin's bank account instead of paying him upfront. This is an Output form.



INVOICE No. 1951

Reg. Installer No. 147091

Homeheat Gas Services

Customer

c/o St Andrews Bureau
Market Hill
Royston Herts.

Date of Invoice 12/4/12

- Gas Boiler Servicing
- Gas Boiler & Central Heating Breakdown Service
- Full Central Heating Installation and Boiler Exchanges
- Landlord Gas Safety Checks

The Cottage
Chapel Road
Gt. Eversden
Cambs
CB23 1HP

Tel: 01223 264942
Mobile: 07778 743353

Re- Flat 1 33-37 High St Royston Herts		
To/ Service Only Fitted Blr		
Fatty out Landl-lords gas Safety check + Service Out		
Sub Total	75	00
20% VAT	15	00
TOTAL	90	00

Payment received with thanks ✓ BACS

Signed

Registered office as above.
VAT Registration No. 677 0421 31

Please pay on this invoice.

Below is an example of a Quote form, this is used as an initial cost report to be agreed on by the Engineer (Colin) and the Client as well as what the job entitles doing. This is an Output Form.

Homeheat Gas Services
Boiler Servicing and Breakdown Service
Boiler Exchanges and Full Central Heating System Installation

Gas safe no. 147091
Vat Reg. No. 6770421311

6th August 2012

Paul Brammer
Village Hall
High Street
Haslingfield
Cambs

Dear Sir

Following the recent visit to the above property please find below a quotation to for the new boiler installation.

Quotation

Drain existing central heating and remove redundant boiler and visible flue, cover flue hole
Supply and install new Valiant Eco Tec Plus condensing boiler and connect to existing pipework
Run condensing pipe and connect to drainage system
Install 3 double radiators in main hall as discussed (inc. valves)
Remove existing fan radiators in rear room
Install 2 x Myson Lo-line fan heaters in rear room and connect to existing pipework
Wire up new boiler and convertor radiators to suit
Including new electronic programmer.
Flush out system and add system prohibitor
Lag pipework to suit
Refill and commission.

For the sum of £3867.00 plus VAT.

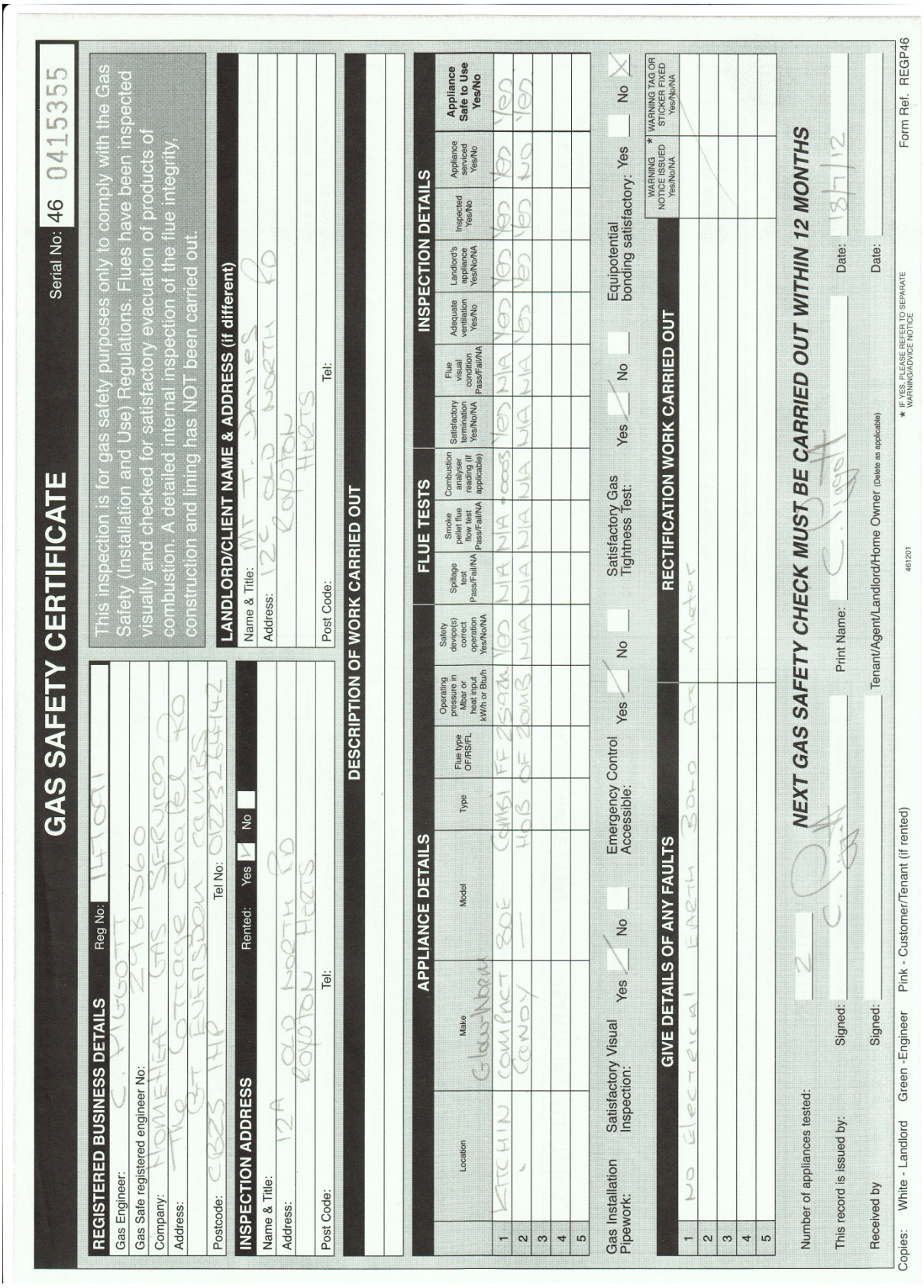
I look forward to your approval.

Yours faithfully

Colin A Piggott

Homeheat Gas Services, The Cottage, Chapel Rd, Great Eversden, Cambs, CB23 1HP
Tel No: 01223 264942, Mobile No. 07778 743353

Finally bellow is an example of a Gas Safety Certificate which is given to Estate Agents if the systems in the house are functioning properly, this is needed before an Estate Agent is allowed to sell or rent a property. This is a Output Form.



GAS SAFETY CERTIFICATE

Serial No: 46 0415355

REGISTERED BUSINESS DETAILS Reg No:

Gas Engineer:

Gas Safe registered engineer No:

Company:

Address:

Postcode: Tel No:

This inspection is for gas safety purposes only to comply with the Gas Safety (Installation and Use) Regulations. Flues have been inspected visually and checked for satisfactory evacuation of products of combustion. A detailed internal inspection of the flue integrity, construction and lining has NOT been carried out.

INSPECTION ADDRESS Rented: Yes ☑ No ☐

Name & Title:

Address:

Post Code: Tel:

LANDLORD/CLIENT NAME & ADDRESS (if different)

Name & Title:

Address:

Post Code: Tel:

DESCRIPTION OF WORK CARRIED OUT

APPLIANCE DETAILS / **FLUE TESTS** / **INSPECTION DETAILS**

	Location	Make	Model	Type	Flue type OF/RS/FL	Operating pressure in Mbar or heat input kW/h or Btu/h	Safety device(s) correct operation Yes/No/NA	Spillage test Pass/Fail/NA	Smoke pellet flue flow test Pass/Fail/NA	Combustion analyser reading (if applicable)	Satisfactory termination Yes/No/NA	Flue visual condition Pass/Fail/NA	Adequate ventilation Yes/No	Landlord's appliance Yes/No/NA	Inspected Yes/No	Appliance serviced Yes/No	Appliance Safe to Use Yes/No
1	KITCHEN	GLOWWORM	80E	COMBI	FF	25KW	YES	N/A	N/A	10.3	YES	N/A	YES	YES	YES	YES	YES
2	"	COMFINET	—	HOB	OF	20MB	N/A	N/A	N/A	N/A	N/A	N/A	YES	YES	YES	NO	YES
3		CONDY															
4																	
5																	

Gas Installation Pipework: Satisfactory Visual Inspection: Yes ☑ No ☐ Emergency Control Accessible: Yes ☑ No ☐ Satisfactory Gas Tightness Test: Yes ☑ No ☐ Equipotential bonding satisfactory: Yes ☐ No ☒

GIVE DETAILS OF ANY FAULTS / **RECTIFICATION WORK CARRIED OUT**

			WARNING NOTICE ISSUED Yes/No/NA	* WARNING TAG OR STICKER FIXED Yes/No/NA
1	NO ELECTRICAL EARTH BOND AT	Meter		
2				
3				
4				
5				

Number of appliances tested: 2

NEXT GAS SAFETY CHECK MUST BE CARRIED OUT WITHIN 12 MONTHS

This record is issued by: Signed: Print Name: Date: 18/7/12

Received by Signed: Tenant/Agent/Landlord/Home Owner (Delete as applicable) Date:

Copies: White - Landlord Green -Engineer Pink - Customer/Tenant (if rented) 461201 * IF YES, PLEASE REFER TO SEPARATE WARNING/ADVICE NOTICE Form Ref. REGP46

2.2 The proposed system

2.2.1 Data sources and destinations

In the proposed system the Clients information will still be received via phone or email and then manually entered by Colin into the system. Due to this part of the system not changing I am assuming Colin has already received the required information from the Client when I use him as the source data in the table below.

Source	Data	Data Type	Destination
Client	Forename	String	Engineer
Client	Surname	String	Engineer
Client	Addr1	String	Engineer
Client	Addr2	String	Engineer
Client	Addr3	String	Engineer
Client	Addr4	String	Engineer
Client	Postcode	String	Engineer
Client	EmailAddress	String	Engineer
Client	PhoneNumber	String	Engineer
Engineer	ClientID	Integer	Database – Client Records,
Engineer	Forename	String	Database – Client Records
Engineer	Surname	String	Database – Client Records
Engineer	Addr1	String	Database – Client Records
Engineer	Addr2	String	Database – Client Records
Engineer	Addr3	String	Database – Client Records
Engineer	Addr4	String	Database – Client Records
Engineer	Postcode	String	Database – Client Records
Engineer	EmailAddress	String	Database – Client Records
Engineer	PhoneNumber	Integer	Database – Client Records
Engineer	ExsistingJobIDs	List/Array	Database – Client Records
Engineer	JobID	Integer	Database – Job Records
Engineer	JobType	String	Database – Job Records
Engineer	JobDetails	String	Database – Job Records
Engineer	PreferedJobDate	Date	Check date and time process
Engineer	PreferedJobTime	Time	Check date and time process
Engineer	QuoteSent	Boolean	Database – Job Records
Engineer	QuoteApproved	Boolean	Database – Job Records
Engineer	JobComplete	Boolean	Database – Job Records
Engineer	InvoiceSent	Boolean	Database – Job Records
Engineer	PriceofParts	Integer	Database – Job Records
Engineer	PriceofFuel	Integer	Database – Job Records
Engineer	MilestoClientsHouse	Integer	Database – Job Records
Calculate Total Price Process	TotalPrice	Integer	Database – Job Records
Create Invoice Process	InvoiceForm	String	Database – Job Records
Check date and time process	JobDate	Date	Database – Job Records
Check date and time process	JobTime	Time	Database – Job Records

Preferred date/time, First Name, Last Name, Job Type, Appointment date/time

Preferred date/time

Engineer

Appointment date/time

Check available dates and times

Preferred date/time

Appointment Table

Appoint-ment date/time

2.2.2 Data flow diagram

First Name, Last Name

Personal Details, Client ID

Job Type, Job Details

Appointment date/time

Key:

Check Existing Customer

Interface

Database – Job Records

First Name, Last Name

Personal Details, Client ID

Job ID

Process

Miles to House

Database – nt Records

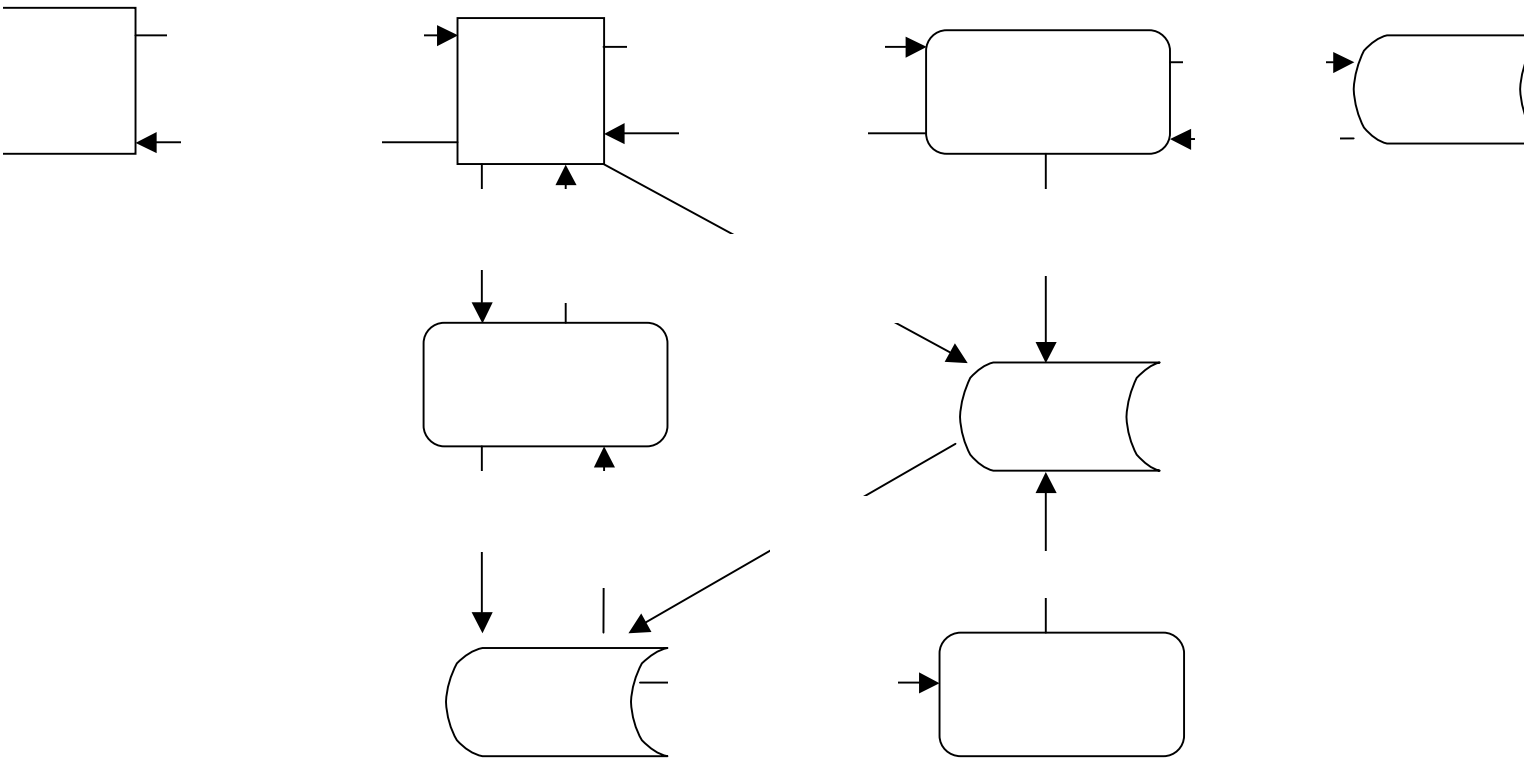
Personal Details

Calculate Miles to House

File/ Database

Data Flow

Booking a job for an existing client:



'referred date/time,
'ersonal Details,
ob Type, Job
)etails

Preferred date/time

Miles to House

Preferred date/time

Appoint-ment date/time

Appointment Table

Engineer

Check available dates and times

Appointment date/time,
Client ID

Booking a job for a new client:

Appointment date/time

Appointment date/time

Job Type, Job Details

ID

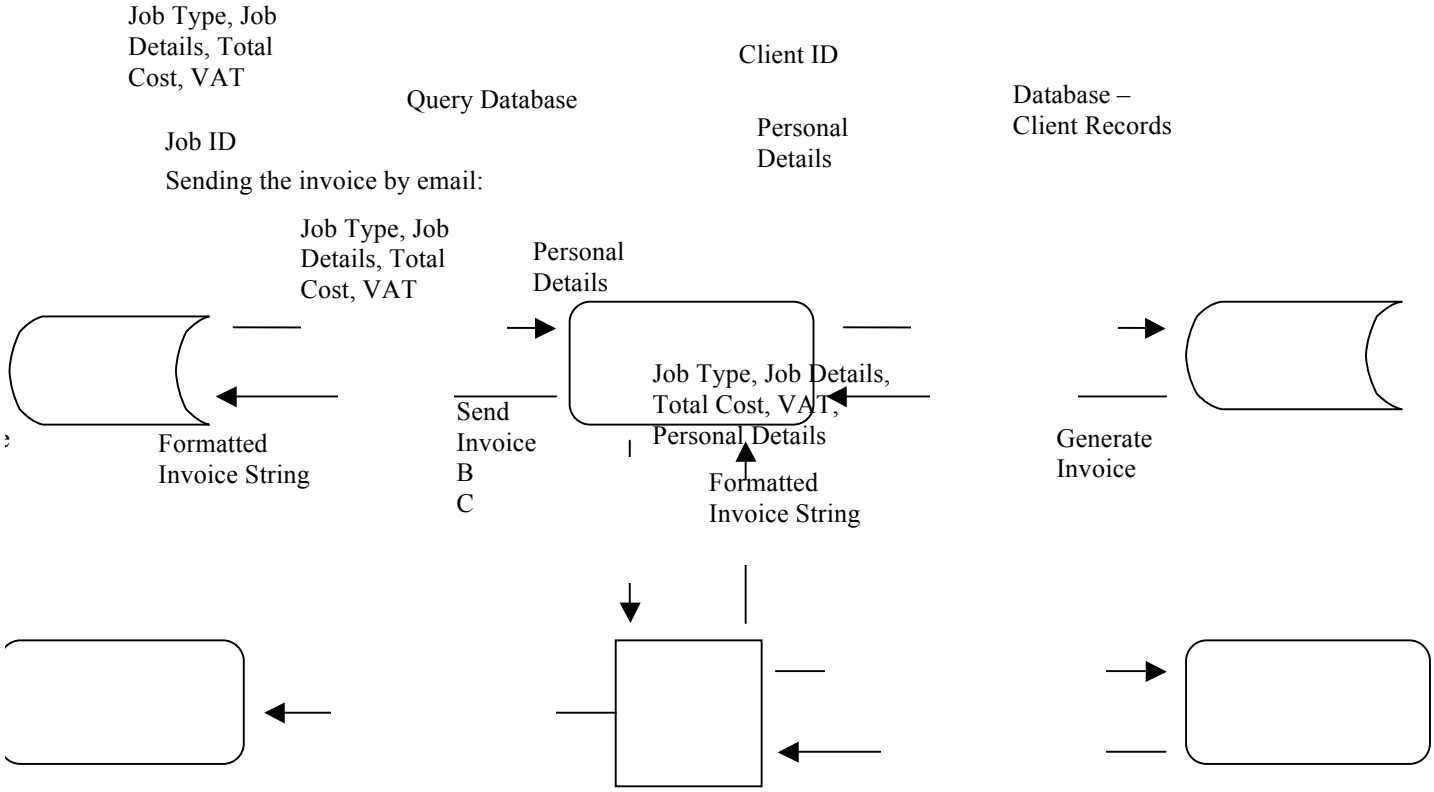
Job ID

Database – Job Records

–

Personal Details

ate Miles to House



2.2.3 Data dictionary

Name	Data Type	Length	Validation	Example Data	Comment
ClientID	Integer	1 - 255	Range	52	
ClientFirstName	String	3 - 20 Characters	Length	John	
ClientLastName	String	3 - 20 Characters	Length	Smith	
ClientAddr1	String	5 - 30 Characters	Length	3 Cedar Close	
ClientAddr2	String	6 - 30 Characters	Length	Melbourn	
ClientAddr3	String	7 - 30 Characters	Length	Royston	
ClientAddr4	String	8 - 30 Characters	Length	Hearts	
ClientPostcode	String	6-7 Characters	Format	SG8 6BL	
ClientPhoneNumber	String	11 Characters	Format	07412989672	
ClientEmail	String	7 - 30 Characters	Length	example@example.com	
ExistingClient	Boolean		Presence Check	False	If the customer has had previous work done for them.
JobID	Integer	1 - 255	Range	52	
JobDetails	String	5 - 50 Characters	Length	Boiler Repair	
JobType	String	6 - 30 Characters	Length	Estate Agent Hire	
JobDate	Date		Format	01/01/2012	
JobStartTime	Time		Range	9:30	
FuelPrice	Integer	1 - 10	Range	4.50	
PriceOfParts	Integer	1 - 300	Range	25.00	
MilesToAddr	Integer	0 - 100	Range	18	
TotalPrice	Integer	1 - 1000	Range	250	
VatPercent	Percentage	1 - 100	Range	20	
QuoteSent	Boolean		Presence Check	False	
QuoteApproved	Boolean		Presence Check	False	

WorkComplete	Boolean		Presence Check	False	
InvoiceSent	Boolean		Presence Check	False	
PaymentReceived	Boolean		Presence Check		Final Stage of the job process

2.2.4 Volumetrics

I chose to use an initial size of 200 different client records; I chose this number because the Client said he can have "2-4 customers a day" (see interview question 5). Including Sunday as a day off and assuming there are 4 different customers each day that is a total of 24 different customers each week. This means 4 different customers can be put into the system each day for just over 2 months; this is plenty of time to adjust to the new system and is still a reasonable starting size for the system. This can later be increased if needed.

Each client of the proposed 200 will have a starting amount of 5 previous job details per client included in the volumetric, this could be increased from the start and instead have less overall client records or simply increased if the database size was increased at a later date.

If the Client Records Database and Job Records Database combined stored 86 fields of data for each client, each field taking up 1KB of hard disk space the minimum database required storage space would be:

86KB * 200 = 17200KB

17200KB / 1024 = 16.8MB

If the rest of the system on its own took up 3MB

16.8MB + 3MB = 19.8MB

This means that the user would require 19.8MB of storage space to use the proposed system with 200 clients, each with 5 previous job detail records.

3. Objectives

3.1 General Objectives

- Clear/ easy to understand layout structure for Client/ Job Records viewing
- Clear/ easy to understand layout structure for Client data input
- Clear/ easy to understand layout to for Job data input
- Clear/ easy to understand layout for sending Invoice
- Clear/ correct directions to the Clients address
- Clear/ correct map image to the Clients address

3.2 Specific Objectives

Client/ Job Records viewing

- Clear set out labels for each attribute of data
- Minimal controls to keep the viewing of records basic and easily accessible.

lient Engineer Appointment

Client data/ Job data input

- Simple input box's clearly labelled for each attribute.
- Drop down box's for attributes such as Gender.

Sending Invoice

Job

- Automate as much of the process as possible to avoid more complex input needed from the user.

Directions

- Retrieve a list of directions from the Google API and display them in the window.
- The system is going to be used on a desktop so the directions can be plain text; no need to track where the Client is.

Mapping

- Retrieve an image from the Google maps API using the clients address.
- Display the map as a non-interactive image.
- If the overview of the route is too big for the window scale it down to fit.

Client Appointment

3.3 Core Objectives

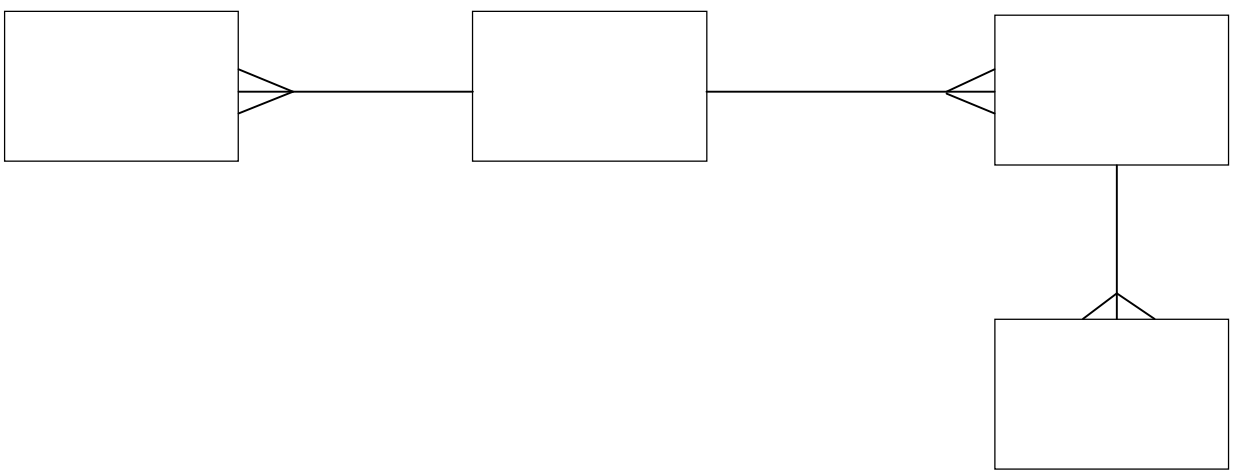
- Client/ Job Records viewing
- Client data/ Job data input
- Sending Invoice

3.4 Other Objectives

- Directions
- Mapping

4. E-R Diagrams and Descriptions

4.1 E-R Diagram



Person 1 Undertakes 1..? Needs a problem solved 1 Consists 1
Engineer Client Job
Many… Appointment
Of a

4.2 Entity Descriptions

Client(ClientID,*EngineerID*,Title,Forename,Surname,Email,Addr1,Addr2,Addr3,Addr4,Postcode,

PhoneNumber)

Engineer(EngineerID,Title,Forename,Surname,Email,Addr1,Addr2,Addr3,Addr4,Postcode,

PhoneNumber,JobsCompleted)

Appointment(AppointmentID,*ClientID*,*EngineerID*,Date,Time)

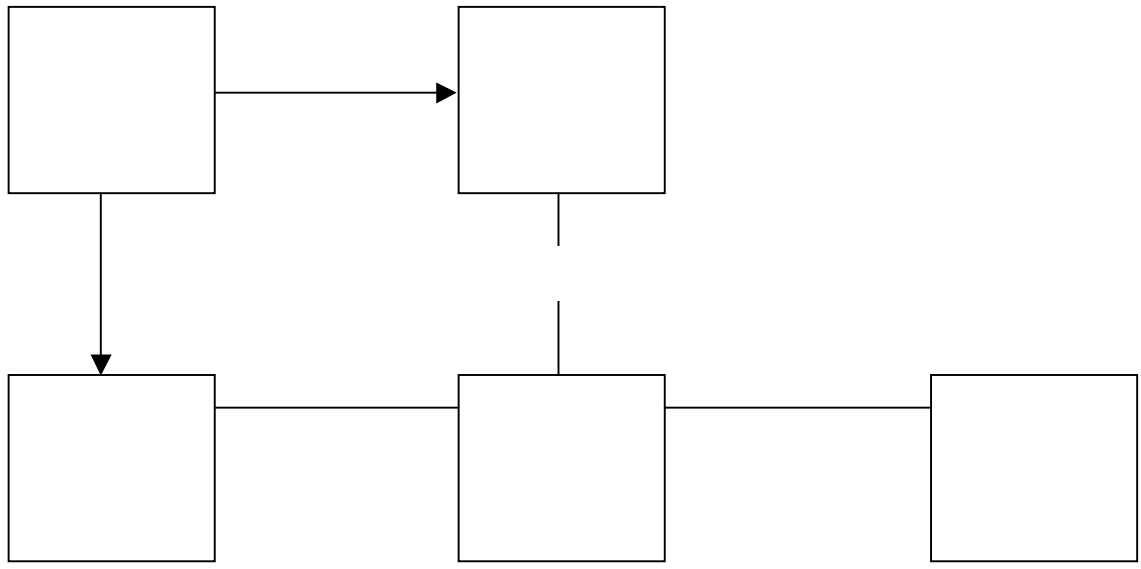
Job(JobID,*AppointmentID*,JobType,Date,TotalCost)

5. Object Analysis

5.1 Object Listing

- Client
- Engineer
- Appointment
- Job

5.2 Relationship diagrams



5.3 Class definitions

Key:

Label
Attributes
Behaviours

[ATTRIBUTE] = Inherited Attribute

Client
[Title] [Forename] [Surname] [Email] [Addr1] [Addr2] [Addr3] [Addr4] [Postcode] [PhoneNumber] PreviousJobsDone
[addTitle] [editTitle] [addForename] [editForeName] [addSurname] [editSurname] [addContactInfo] [editContactInfo] addJobs editJobs

Engineer
[Title] [Forename] [Surname] [Email] [Addr1] [Addr2] [Addr3] [Addr4] [Postcode] [PhoneNumber] JobsCompleted
[addTitle] [editTitle] [addForename] [editForeName] [addSurname] [editSurname] [addContactInfo] [editContactInfo] addCompletedJobs editCompletedJobs

Appointment
ClientID ClientName ClientAddr ClientPhoneNo JobDetails JobType Date Time
addClientID editClientID addClientName editClientName addClientAddr editClientAddr addJobDetails editJobDetails addJobType editJobType addDate editDate addTime editTime

Job
Date Time Type Details Comments PartsNeeded TotalPrice VAT HoursTaken QuoteApproved WorkComplete InvoiceSent PaymentReceived
addDate editDate addTime editTime addDetails editDetails addComment editComments addParts editParts calculateTotalPrice reculculateTotalPrice addVAT editVat addHours editHours changeWorkStates

Person
Title Forename Surname Email Addr1 Addr2 Addr3 Addr4 Postcode PhoneNumber
addTitle editTitle addForename editForeName addSurname editSurname addContactInfo editContactInfo

6. Other Abstractions

6.1 Graphs

7. Constraints

7.1 Hardware

Currently Colin uses his sons Desktop Computer (Custom built Gaming Computer) to send a few occasional emails and undertake simple web surfing activities. The new system will need to be able to run on this machine.

Computer Specifications:

- 19” Display
- Intel® Core™ i5-2500k Quad Core (Sandy Bridge) CPU @ 3.30GHz (Overclocked to 4.4GHz)
- 8.00GB DDR3 RAM
- Asus P8Z86 DELUXE Edition Gaming Motherboard
- 1.5 TB HDD
- ATI Radeon HD 6970 Graphics Card

The demand of the proposed system will make little impact to no impact on this system – the requirements to run the proposed system will be far less than the amount of computing power the current hardware can give.

There are a few hardware constraints even though the computer specifications exceed what is needed. One of these is that the computer is a desktop computer; this means the system is constrained to where Colin chooses to base the computer. Additionally the system cannot run without a consistent power source due to the computer not having a battery.

Another constraint is the screen resolution; the system will need to be designed and implemented to fit the screen size appropriately.

7.2 Software

Colin has not given any preference to what software can or cannot be used. Although due to it being his son’s computer he would prefer it if as little changes to the software can be made as possible, such as the operating system. The proposed system will run fine on the current version of windows which the hardware is running so this is not a problem.

7.3 Time

The only deadline or time restriction for this project is the deadline set by my teacher, which is (unless due to change) January 2013. Colin does not need the system before this deadline but will be happy to start using it early if it is finished before the deadline.

7.4 User knowledge

At the current time Colin does not have any academic qualifications in ICT or other IT related subjects and does no plan on taking a course in the near future. He has very little knowledge of computers and IT related language so the end system will need to take this into account when designing the interface and functionality. His only

use for computers currently is simple web surfing and emailing, by using similar designs to the browser he uses (Internet Explorer) it may make it easier to learn. A full user manual will be included to help aid the simple to use and hopefully familiar looking interface.

7.5 Access restrictions

The proposed system should only be accessible by Colin who will have full access/privileges to all the data on the system, this is be password protected to ensure only Colin can gain access.

Due to the system containing private and confidential data on individuals it will have to comply with the Data Protection Act and appropriate action will be taken to do so, due to Colin being the only user of the system this will be a lot easier to keep secure and safe.

8. Limitations

8.1 Areas which will not be included in the computerisation

The initial collection of the Clients data (e.g. Name, Address, etc.) will still be acquired using a phone call to the Client due to it being a lot easier to gather the required details Colin needs by speaking to the Client directly instead of a relay of different emails to decide when is best for a visit to be made to undertake the work/ check the problem.

8.2 Areas considered for future computerisation

The quote given to customers is going to continue as a paper output form. This could be changed to use an automatic emailing system initially to send the quote with instructions on how to reply in a certain format. This could then be read by the system automatically once received for an “Agree” or “Disagree”. This could greatly increase the speed of starting the work but will only be included if I have enough time after finishing the rest of the system to learn the required knowledge to undertake and finish this part of the system.

9. Solutions

9.1 Alternative solutions

Solution	Advantages	Disadvantages
Custom Spread Sheet	No extra software needed other than Spread Sheet software such as “Microsoft Excel”.	Available Spread sheet software may not be specific enough to cater to the Client specific needs.
Web Based Application	Can access anywhere with an internet connection. Can easily make use of ‘cloud’ backups. Available to more than one engineer at a time if needed.	More security methods needed due to the system always being online. Web hosting costs can be expensive. More extensive knowledge needed due to more external programs needed to operate the system.
Re-organising/ designing the current manual system	Very low cost. No computer/ software needed. No Need to learn new skills. System is easily learnable for	The current problems may still exist. Large amount of physical storage needed.

	possible future employees.	
Command-line Application	Easier to design/ program. Often runs faster than GUI applications. Uses less system resources. Work can be undertaken very fast if knowledge to do so is available.	A lot of training needed to use each command. Often "hidden" commands the Client didn't know existed. Not user-friendly for someone with little computer knowledge. A lot more error checking needs to be implemented due to no restriction of what the user can enter by default.
Python Desktop Application with a GUI	Little training needed for all experience levels. Layout/design can be specific for the client. Easier to understand what is happening (charts/graphs). Easier to view large amounts of data. Data can be easily formatted. Using features such as radio buttons can minimise errors.	A lot more time needed/ programming difficulty making a GUI application than a Command driven interface. More computer resources needed to run the application.

9.2 Justification of chosen solution

I have chosen to choose the 'Python Desktop Application with a GUI' solution, my reasons for this are:

- The applications will be specific to my Client's requirements/ needs, unlike with premade software such as Spread sheets.
- A lot less physical space will be needed to store the same or even more data due to it being stored digitally instead of physically.
- Backups and restores can be made to the system if necessary.
- Using the desktop application will take less time than filling in multiple copies of form such as Invoices.
- I already know the Python Programming Language, where as I do not know any web based languages to create a Web base application and limited knowledge with creating advanced Spread Sheets.