



Final Project

Ger's Garage

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1 Project Introduction:

The first chapter sets the background and motivation for the project. The problem to be solved is stated, with the project aims and a list of specific objectives.

The chapter could include:

- A brief synopsis of the project context (supplied by CCT)
- General areas of computing that project context covers / requires knowledge of
- Brief summary of your initial proposed plan for addressing the project context
- Short section arguing ‘why’ this is a good project – outline Individual’s skills, interests, strengths – they Individual can describe how the project brings together many of the modules they’ve listed
- Novel aspects – a real world business or organisation or taking advantage of new technology

1.1 Part 1: Overview

Ger is a mechanic who runs a small garage. He carries out maintenance checks for all kinds of small to medium vehicles (i.e. motorbikes, cars, small vans and small buses). He has a small number of staff who work with him.

In most cases, a maintenance check will require parts or other supplies (e.g. brake fluid; engine oil). He keeps a stock of common supplies at his garage and sells them to customers if/when needed. He needs an online service to allow customers to book their vehicles in for a check-up or service. He has asked you to build a WEB-BASED [OR MOBILE] application to fulfil his requirements.

Project overview:

He carries out maintenance checks for all kinds of small to medium vehicles (i.e. motorbikes, cars, small vans and small buses). He has a small number of staff who work with him.

In most cases, a maintenance check will require parts or other supplies (e.g. brake fluid; engine oil). He keeps a stock of common supplies at his garage and sells them to customers if/when needed.

He needs an online service to allow customers to book their vehicles in for a check-up or service. He has asked you to build a WEB-BASED [OR MOBILE] application to fulfil his requirements.

Ger’s garage minimum requirements:

- A new website for Ger’s Garage is created that advertises his garage and his services.
[OPTION – YOU COULD CREATE THIS AS A MOBILE APPLICATION INSTEAD]
 1. websites
 2. mobile applications

Booking services:

Customers can register on the website and book their vehicle in for a service OR a repair.
There must be AT LEAST 4 types of booking:

1. Annual Service
2. Major Service
3. Repair / Fault
4. Major Repair

Login Service:

Registered customers should be able to login on future occasions and the system should remember their details. This would include details of the vehicle they LAST booked in to the garage

Booking checklist:

Customers need to be able to select a DATE for their service. The website should limit the number of bookings allowed per day (you can decide the limit, but this should be realistic for a small garage). If there is no available space for a day, then the customer should not be able to book a service on that day.

Ger’s garage is closed on Sundays for service bookings. DO not allow customers to select a Sunday.

Information about the vehicles:

Customers will need to be able to provide some basic information about themselves and their vehicles:

- Customer name & contact details (mob phone essential)
- Vehicle type & make
- Vehicle licence details
- Vehicle engine type
 - diesel
 - petrol
 - hybrid
 - electric
- Booking Required
 - Annual Service
 - Major Service
 - Repair / Fault
 - Major Repair
- Customer Comments (to allow customer add any notes they want to add, such as a description of the problem)

Ger administration:

Ger needs to have an admin access to the site to view bookings for any particular day OR week, so that he can plan his work & staff rostering. You can assume Ger has at least 4 mechanics available on any one particular day (you can change this, but be realistic – this is a small garage!)

He needs to be able to allocate a mechanic to each vehicle. You can assume that all of his staff are able to carry out any type of service / repair and that each mechanic could carry out AT MOST 4 services/repairs in one day. If the booking is a Major Repair then this would count double.

Printing services:

He needs to be able to print the schedule for any particular date.

He needs to be able to allocate costs to each booking. You can assume a basic fixed cost (e.g. an Annual Service might cost €200 minimum).

Items/Parts:

Ger needs to be able to add to this the cost of any item/parts that were needed to fix/service the vehicle. For example, if a tyre needed to be replaced then the cost of the tyre would be added and the cost of carrying out a “wheel balancing” would be added.

You can decide the cost of each item/part and what types of items/parts you include, but you should be realistic. You do not have to provide an exhaustive list of parts, but the more you provide the more realistic your final product will be. AT A MINIMUM you should provide 40 different parts/items for the garage.

Note that the customer has to provide details of the type and make of car (e.g. Car - Ford Fiesta). The site MUST allow for motorbikes, cars, small vans and small buses. You can decide how many different makes to provide as default, but you MUST provide at least 30 in total. Make sure to allow the user choose “other” if their vehicle is not in the list.

Booking statuses:

Ger needs to be able to set each booking to one of 5 possible statuses:

1. Booked – this is the default status when a booking is made
2. In Service – when the vehicle arrives at the garage
3. Fixed / Completed – when the vehicle is ready for collection
4. Collected – When the customer has taken the vehicle away and paid their bill
5. Unrepairable / Scrapped – when the fault cannot be fixed; in this case the car has either been taken away by the customer or has been sent for scrap.

Invoice:

Ger needs to be able to print an “invoice” or bill for each customer when the service/repair is complete. This should provide an itemised bill for the customer. For example:

CUSTOMER:

Joe Bloke

Mob No: 085 02140201

Vehicle: Peugeot 406

Licence: 12 G 123456

Annual Service €189

Mini Valet	€39
Car mat	€17
TOTAL DUE	€245

Payment due on collection.

You can assume that the actual payment is handled by Ger at his checkout / on another system. You do not need to process payments or issue a receipt. To achieve a distinction grade you should aim to include additional functionality that has not been specified here but which would make sense within the project brief.

REPORT GUIDANCE:

For the design section of your report, you should aim to include the following
ESSENTIAL:

- Wireframe designs for the website. Include key pages – you may not need to include every single page.
- Functional Requirements – set out the various requirements in a structured manner and specify a level of priority (e.g. Must have, etc.)
- Data Requirements – set out the data you will need to store using a ‘data dictionary’ or similar structured layout. Make sure you specify data types, restrictions and any other important details
- Database tables – should be normalized to 3NF minimum

DIAGRAMS

- Include design diagrams to detail your design. Examples would include: a class diagram, and E-R Diagram, Use-cases.

JUSTIFICATION

Why did you choose this wireframe design? How did you determine your data requirements? How did you construct your class diagram and/or use-cases?

1.2 Part 2: Purpose

Why need Gerg a website?

Small medium or large size of the business has to have a website or mobile app because this is the key to making sales and contact with the customers. Consumer behavior changes over time to adapt to modern technology, and consumer behavior has changed to adapt to the digital age.

At the 21 century, the key is to get real-time and communication with the customer. The 1930s, advertising in the Yellow Pages. It was a standard operating procedure for most businesses.

Then came the world wide web (WWW) and a new disruption to the commercial status of the digital transformation. As more and more consumers realized they could find what they needed online faster and more effectively than a phone book, behavior moved away from using the printed directory. Nowadays at 2019, and the number of purchasers that go online to find a local business has jumped to 97 percent. If you want them to choose your company, you need to be found online—meaning you need a website.

“Websites work. No matter what your business or profession, a website can generate business, promote goodwill among customers and prospects, and deliver strong marketing messages - whether your business is small, large or in-between, well-established or brand-new.

People use the Web in greater and greater numbers, more and more every day. Even if you are a completely local small business, service, contractor or consultant, odds are people have used search engines to look for your web site - and if you don't have a web site... well, you get the picture.

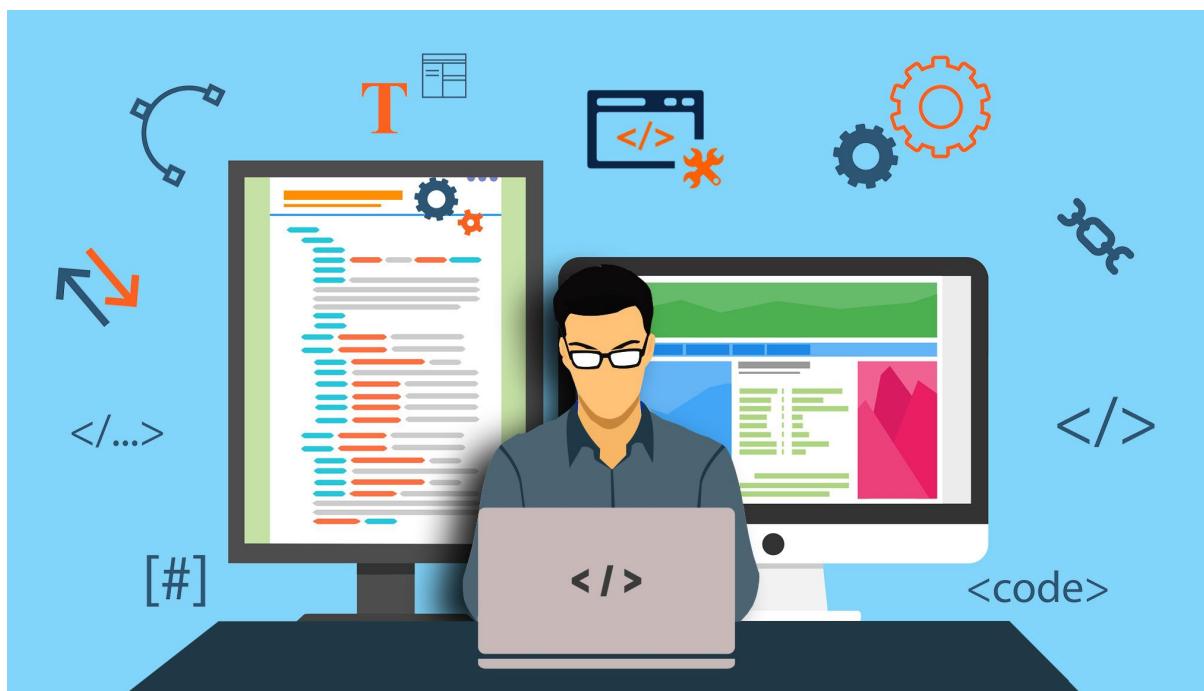
” <http://www.networksolutions.com/education/business-needs-website/>

The is a couple of the reason why small business needs a Website

- The customers expect it.
The customer has to trust a business
- It provides social proof.
The potential customers are already looking for you online, including customer recommendations on your site is a great way to impress potential clients.
- Influence the clients
You can control the communication channel
- You can control the communication channel
- The competitors all have company websites.
- You will be visible on the Google search results
- Display your products or outline your services in detail

Web Developer:

A Web developer is a programmer whose development of applications to the World Wide Web (WWW). Web developers design website and website application. Web developers are responsible for designing and develop a website and website application. The developer can use many languages (HTML, PHP, JavaScript, JQuery, etc), and can develop with different technology. He or she has to manage the site, implement application features and manage security.



<https://medium.com/level-up-web/developer-roadmaps-all-in-one-place-75c0402db0e0>

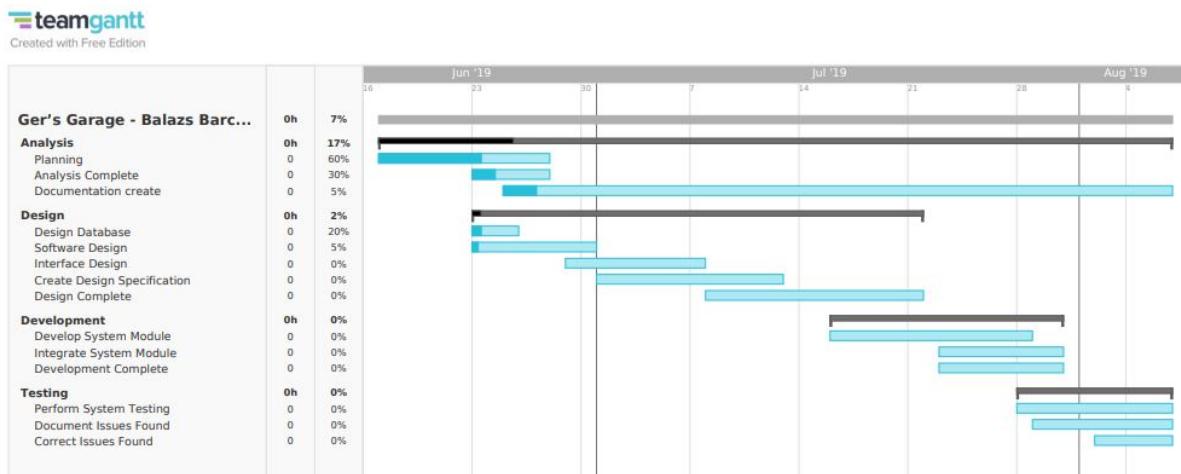
The 9 Web Technologies Every Web Developer Must Know in 2019

1. Browsers
2. HTML & CSS
3. Web Development Frameworks
4. Programming Languages
5. Protocols
6. API
7. Data formats

8. Client (or Client-side)
9. Server (or Server-side)

More information <https://tms-outsource.com/blog/posts/web-technologies/>

My origin project plan.



I have chosen this project because I wanted to build an app (website) and I wanted to use the Google cloud platform. I think this is the future more and more project will move to the cloud. It is a game changer because It is more playable and advances.

1. Less Costs

The services are free from capital expenditure. There are no huge costs of hardware in cloud computing. You just have to pay as you operate it and enjoy the model based on your subscription plan.

2. 24 X 7 Availability

Most of the cloud providers are truly reliable in offering their services, with most of them maintaining an uptime of 99.9%. The workers can get onto the applications needed basically from anywhere. Some of the applications even function off-line.

3. Flexibility in Capacity

It offers flexible facility which could be turned off, up or down as per the circumstances of the user. For instance, a promotion of sales is very popular, capacity can be immediately and quickly added to it for the avoidance of losing sales and crashing servers. When those sales are done, the capacity can also be shrunk for the reduction of costs.

4. All over Functioning

Cloud computing offers yet another advantage of working from anywhere across the globe, as long as you have an internet connection. Even while using the critical cloud services that offer mobile apps, there is no limitation of the device used.

5. Automated Updates on Software

In cloud computing, the server suppliers regularly update your software including the updates on security, so that you do not need to agonize on wasting your crucial time on maintaining the system. You find extra time to focus on the important things like 'How to grow your businesses.'

6. Security

Cloud computing offers great security when any sensitive data has been lost. As the data is stored in the system, it can be easily accessed even if something happens to your computer. You can even remotely wipe out data from the lost machines for avoiding it getting in the wrong hands.

7. Carbon Footprint

Cloud computing is helping out organizations to reduce their carbon footprint. Organizations utilize only the amount of resources they need, which helps them to avoid any over-provisioning. Hence, no waste of resources and thus energy.

8. Enhanced Collaboration

Cloud applications enhance collaboration by authorizing diverse groups of people virtually meet and exchange information with the help of shared storage. Such capability helps in improving the customer service and product development and also reducing the marketing time.

9. Control on the Documents

Before cloud came into being, workers needed to send files in and out as the email attachments for being worked on by a single user at one time ultimately ending up with a mess of contrary titles, formats, and file content. Moving to cloud computing has facilitated central file storage.

10. Easily Manageable

Cloud computing offers simplified and enhanced IT maintenance and management capacities by agreements backed by SLA, central resource administration and managed infrastructure. You get to enjoy a basic user interface without any requirement for installation. Plus you are assured guaranteed and timely management, maintenance, and delivery of the IT services.

<https://www.idexcel.com/blog/top-10-advantages-of-cloud-computing/>

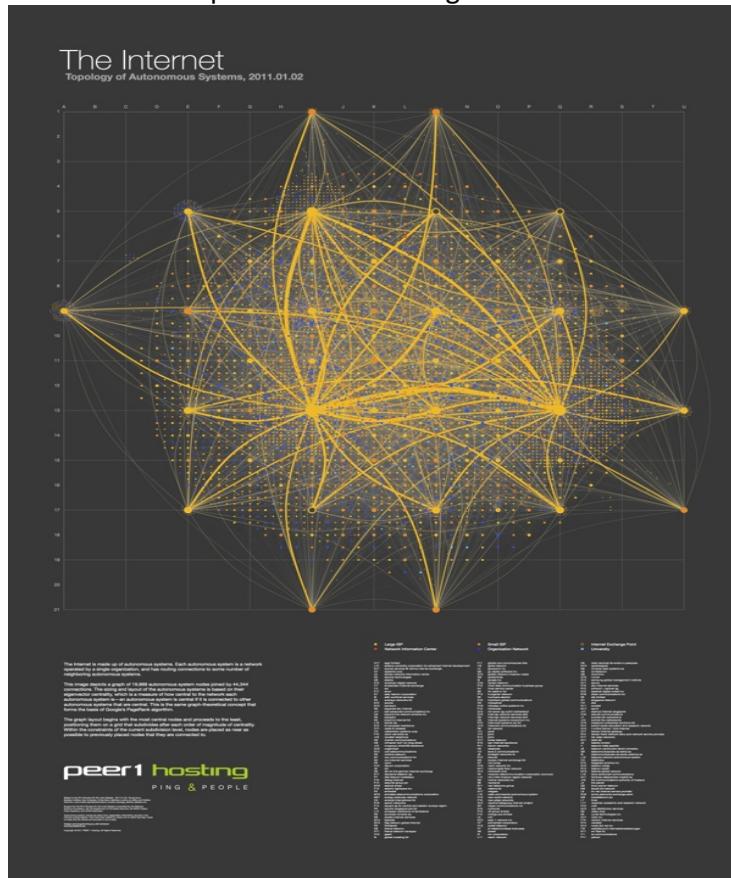
2 Literature Review:

The aim of this chapter is to present all academic research carried out throughout the project cycle. It is important that learners produce research that defends their justifications for choosing one from of technology or software over another, and other sources of information that have helped inform the individuals thinking, planning and delivery of the project.

2.1 Part 1: Cloud Computing Services

What is the cloud computing?

Before we go deeper to cloud computing We have to define the cloud. This is the technology not older than 10 years and nowadays is happening the change. Why the people using the cloud that a logo, Because It is easy to draw it. But if we looking at the big picture we will see cloud computing is similar that the real cloud. In the cloud, We can find a lot of h2o and cloud computing we will find a lot of computers is connecting each other.



The Map of the Internet — Cool Infographics
<https://coolinfographics.com/blog/2011/4/7/the-map-of-the-internet.html>

“It’s a layout of all the networks that are interconnected to form the internet. Some are run by small and large ISPs, university networks, and customer networks - such as Facebook and Google. It’s visual representation of all those networks interconnecting with one another, forming the internet as we know it. Based on the size of the nodes and the thickness of the lines, it speaks to the size of those particular providers and the connections.”

Randy Krum Designer | Author | Instructor

<https://coolinfographics.com/blog/2011/4/7/the-map-of-the-internet.html>

Those small computers are working together that a big resource. Those computers are sharing the resource with each other.

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is regularly used to describe datacenters available to many clients over the Internet. Big clouds, dominant today, often have roles spread over many locations from central servers. If the connection to the user is relatively close, it may be designated an edge server.

Fundamentally, cloud computing is the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.

Cloud computing services have several standard properties:

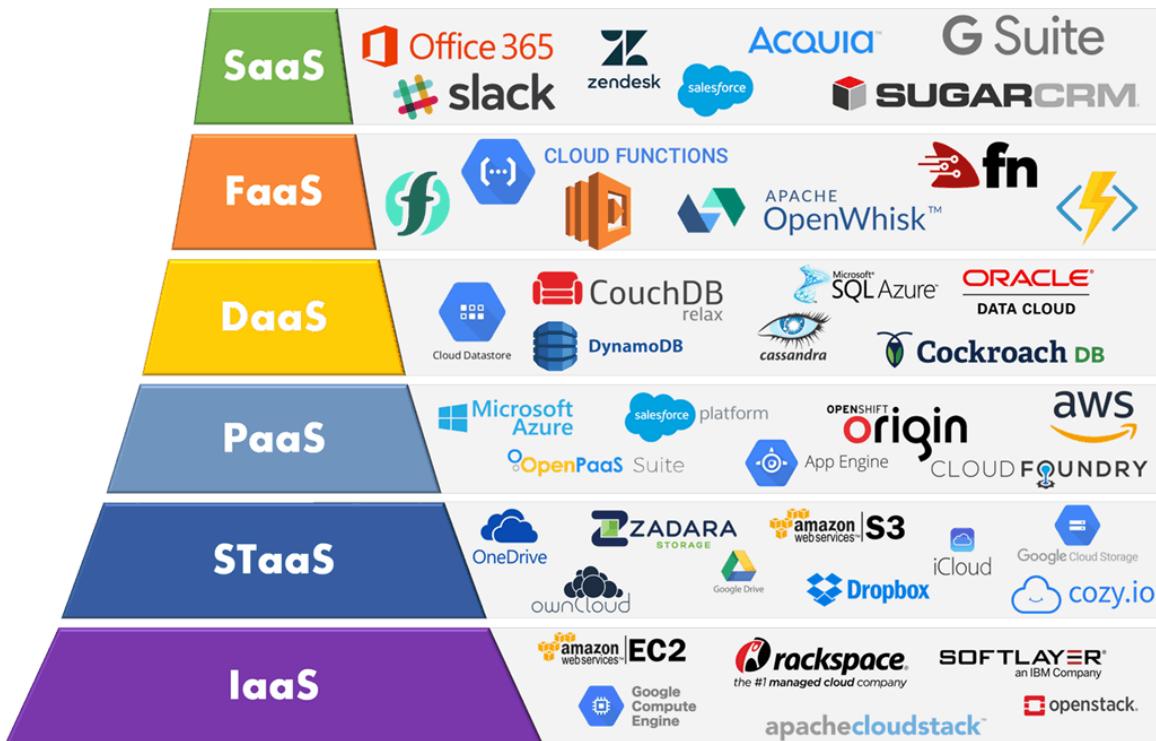
- Virtualization- cloud computing utilizes server and storage virtualization extensively to allocate/reallocate resources rapidly
- Multi-tenancy-resources are pooled and shared among multiple users to gain economies of scale
- Network-access- resources are accessed via web-browser or thin client using a variety of networked devices (computer, tablet, smartphone)
- On demand- resources are self-provisioned from an online catalogue of pre-defined configurations
- Elastic-resources can scale up or down, automatically
- Metering/chargeback-resource usage is tracked and billed based on service arrangement

Cloud computing services delivered internally or by third-party service:

- Software as a Service (SaaS) – software runs on computers owned and managed by the SaaS provider, versus installed and managed on user computers. The software is accessed over the public Internet and generally offered on a monthly or yearly subscription.
- Infrastructure as a Service (IaaS)– compute, storage, networking, and other elements (security, tools) are provided by the IaaS provider via public Internet, VPN, or dedicated network connection. Users own and manage operating systems, applications, and information running on the infrastructure and pay by usage.

- Platform as a Service (PaaS)— All software and hardware required to build and operate cloud-based applications are provided by the PaaS provider via public Internet, VPN, or dedicated network connection. Users pay by use of the platform and control how applications are utilized throughout their lifecycle.

Cloud services delivery models



<https://imelgrat.me/cloud/cloud-services-models-help-business/>

Models of cloud computing:

Not all clouds are the same, different users, different type of cloud computing system right for them. Different models, types, and services offer the right solution. There are three different ways to deploy cloud services: on a public cloud, private cloud, or hybrid cloud.



<https://www.allcovered.com/the-learning-center/cloud-revolution-or-evolution-582>

- Public cloud
Public clouds are owned and operated by a third-party cloud service providers, Public cloud provides computing resources, like servers and storage, over the Internet. The cloud provider owned and managed all hardware, software and other infrastructure.
- Private cloud
A private cloud belongs to cloud computing resources used exclusively by a single business or organization. It can be located on the company's data center, or companies can pay third-party service providers to host private cloud.
- Hybrid cloud
Hybrid clouds join public and private clouds. The technology permits applications and data to be shared between them. The data and applications can transfer between private and public clouds, a hybrid cloud gives to the business adaptability, more deployment options, and helps optimize your current infrastructure, security, and compliance.

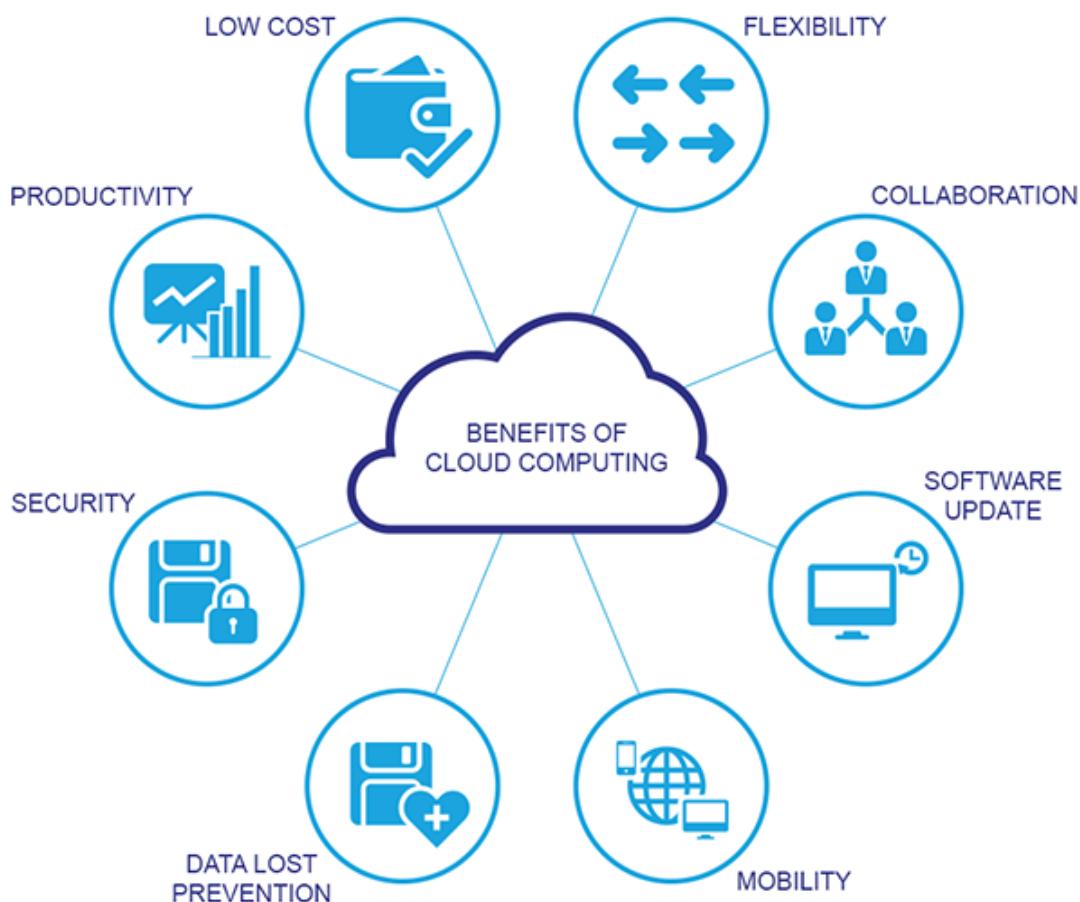
Cloud computing services offer numerous benefits:

- Faster implementation and time to value
- Anywhere access to applications and content
- Rapid scalability to meet demand
- Higher utilization of infrastructure investments
- Lower infrastructure, energy, and facility costs
- Greater IT staff productivity and across organization
- Enhanced security and protection of information assets

Cloud computing in the business view:

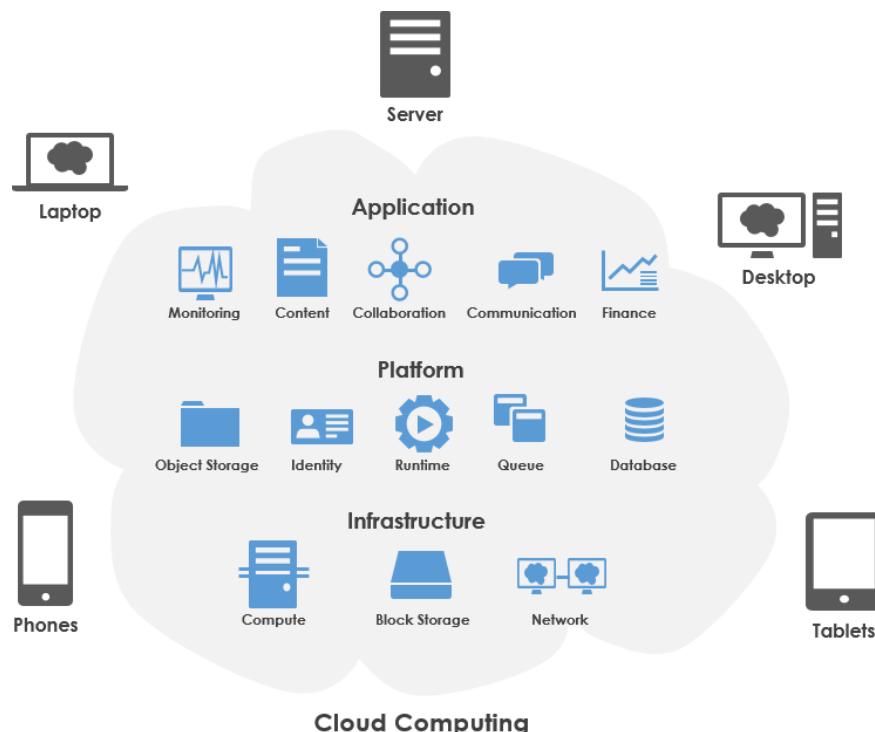
- Cost
If you use Cloud computing You do not need to buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling.
- Productivity
Datacenters typically require a lot of “racking and stacking”—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing eliminates the need for many of these jobs, so IT teams can spend time on achieving more important business goals.
- Security
The cloud providers offer methods, technologies, and controls and security on your products. It is helping protect your data, apps, and infrastructure.
- Performance
The most significant cloud computing services run on a worldwide network of secure datacenters, which are usually improved to the latest generation of fast and efficient computing hardware. This offers several benefits over an individual corporate datacenter, including reduced network latency for applications and greater economies of scale.

- Global scale
The cloud computing service can be scaled, so the users can choose the right size of IT resources. Can make computer power stronger, storage size, change location.
- Speed
The system more flexible, few minutes and the user can create service.
- Reliability
Cloud computing makes data backup, recovery, faster and save because data can be copied at multiple locations.



<http://www.visiontechme.com/cloud-computing.php>

You can use an online service to send an email, edit documents, watch movies or TV, listen to music, play games, or store pictures and other files, it's likely that cloud computing is making it all possible.



<https://www.visual-paradigm.com/guide/cloud-services-architecture/what-is-aws-architecture/>

Create new apps and services

Quickly build, deploy, and scale applications—web, mobile, and API—on any platform. Access the resources you need to help meet performance, security, and compliance requirements.

Test and build applications

Reduce application development cost and time by using cloud infrastructures that can easily be scaled up or down.

Store, back up, and recover data

Protect your data more cost-efficiently—and at massive scale—by transferring your data over the Internet to an offsite cloud storage system that's accessible from any location and any device.

Analyze data

Unify your data across teams, divisions, and locations in the cloud. Then use cloud services, such as machine learning and artificial intelligence, to uncover insights for more informed decisions.

Stream audio and video

Connect with your audience anywhere, anytime, on any device with high-definition video and audio with global distribution.

Embed intelligence

Use intelligent models to help engage customers and provide valuable insights from the data

captured.

Deliver software on demand

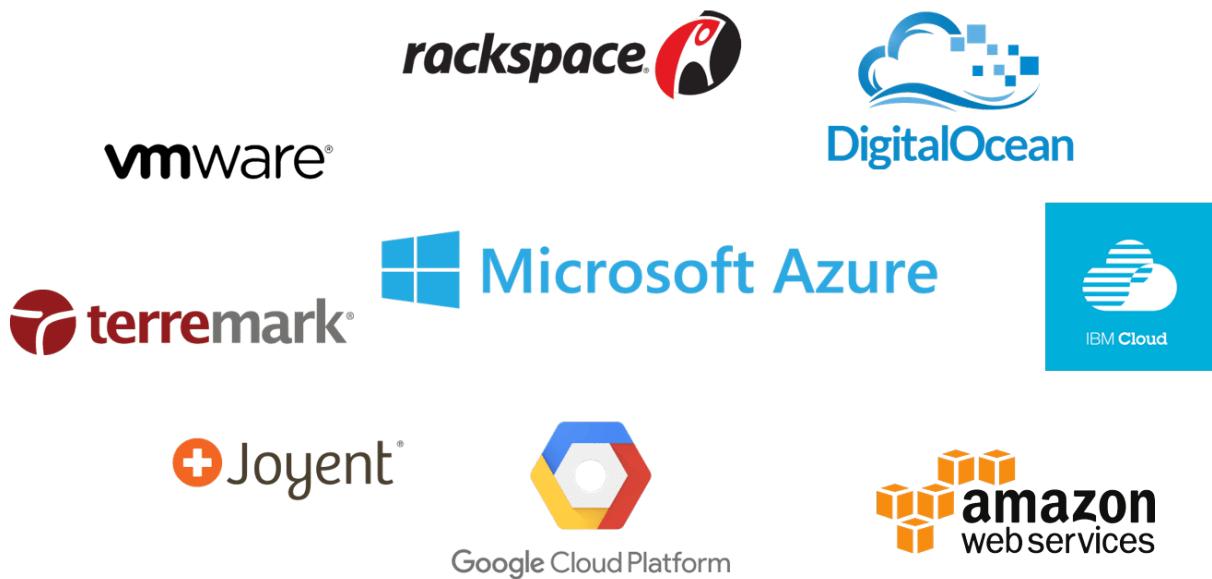
Also known as software as a service (SaaS), on-demand software lets you offer the latest software versions and updates around to customers—anytime they need, anywhere they are.

2.2 Part 2: Google Cloud Platform

1. Cloud Service Providers

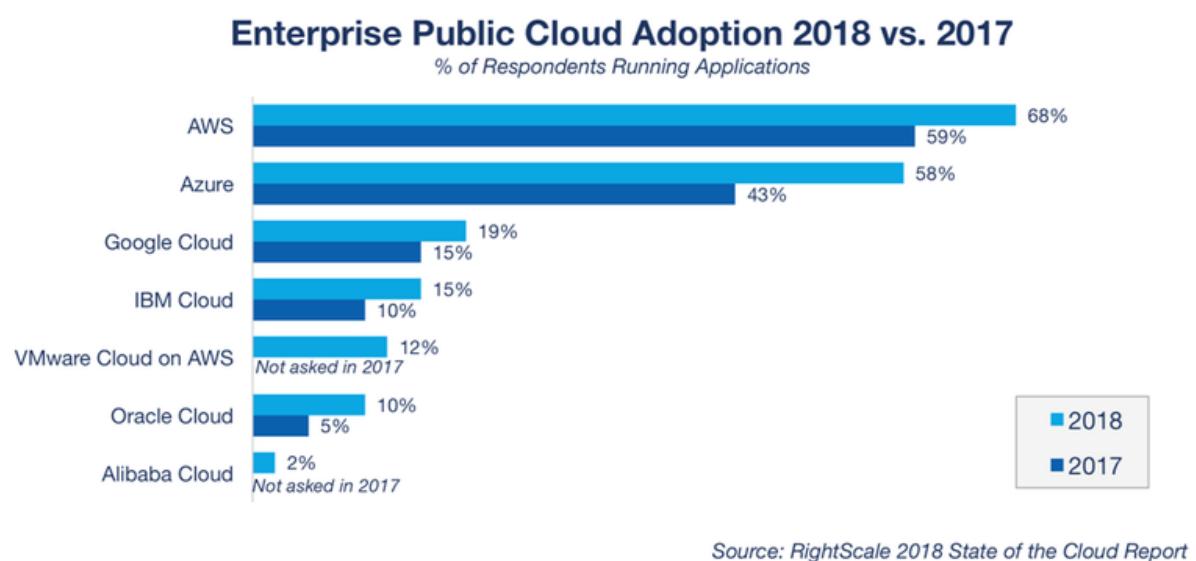
Cloud Computing Services are Information Technology (IT) as a service over the Internet. Cloud computing is a term which is used for storing and accessing data over the internet. It doesn't store any data on the hard disk of your PC. Cloud computing helps you to access your data from a remote server.

Cloud computing services range from full applications and development platforms to servers, storage, and virtual desktops. There's are various types of cloud computing services are available in the market.



<https://www.edureka.co/blog/what-is-azure/>

Market share 2018



<https://www.zdnet.com/article/top-cloud-providers-2018-how-aws-microsoft-google-ibm-oracle-alibaba-stack-up/>

2. What is the GCP and Why should We choose it.

GCP short name of the Google Cloud Platform.

Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments. Google, is a cloud computing service provider that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube, Gsuite.

This is developing dynamically and improving and the 3rd bigger provider.

Google offers free 300 dollars free credit, to the user. The clients can use this credit to test the system before a charge.

Google has been in the cloud computing race for much less time than the incumbent leader AWS. Amazon Web Services rakes in about \$6 billion per quarter — still way ahead of Google Cloud, but from market trends, Google Cloud seems to be the fastest growing cloud platform today.

Google Cloud is differentiated and place GCP ahead of the other service providers in the industry.

- Billing per second
Google Cloud charges customers for usage of its compute engine instances in one-second increments having a one-minute minimum.
- Big Data
GCP has next-gen frameworks for data warehousing, advanced machine learning, and visual analytics give it an edge in data processing and analytics.
- User-friendly interface
It's CloudShell, great tutorials, clear communication, and well-integrated services.
- Kubernetes leadership
It is the creator of Kubernetes, the container management platform.



Google Cloud Platform

<https://medium.com/google-cloud/deploying-websockets-cluster-to-gcp-with-lets-encrypt-certificates-5ebb7fc1e245>

Few companies that are using Google Cloud Platform (Compute Engine or App Engine) include Spotify, HSBC, Home Depot, Snapchat, HTC, Best Buy, Philips, Coca Cola, Domino's, Feedly, ShareThis, Sony Music, Ubisoft, and Apple.

3. Google Cloud Platform Products



https://www.slideshare.net/Hadoop_Summit/running-apache-hadoop-on-the-google-cloud-platform

Google Cloud Platform products span the following categories:

- API management: API Analytics, API Monetization, Cloud Endpoints, Developer Portal, Cloud Healthcare API
- Artificial intelligence & machine learning: AI Hub (beta), Cloud AutoML (beta), Cloud TPU, Cloud Machine Learning Engine, Diagflow Enterprise Edition, Cloud Natural Language, Cloud Speech-to-Text, Cloud Text-to-Speech, Cloud Translation, Cloud Vision, Cloud Video Intelligence, Cloud Inference API (alpha), and more
- Compute: Compute Engine, Shielded VMs, Container security, App Engine, Cloud Functions, GPU, and more
- Data analytics: BigQuery, Cloud Dataflow, Cloud Dataproc, Cloud Datalab, Cloud Dataprep, Cloud Composer, and more
- Databases: Cloud SQL, Cloud Bigtable, Cloud Spanner, Cloud Datastore, Cloud Memorystore
- Developer tools: Cloud SDK, Container Registry, Cloud Build, Cloud Source Repositories, Cloud Tasks, and more, as well as Cloud Tools for IntelliJ, PowerShell, Visual Studio, and Eclipse
- Internet of Things (IoT): Cloud IoT Core, Edge TPU (beta)
Hybrid and multi-cloud: Google Kubernetes Engine, GKE On-Prem, Istio on GKE (beta), Anthos Config Management, Serverless, Stackdriver, and more
- Management Tools: Stackdriver, Monitoring, Trace, Logging, Debugger, Cloud Console, and more
- Media: Anvato, Zync Render
- Migration: Cloud Data Transfer, Transfer Appliance, BigQuery Data Transfer Service, Velostrata, VM Migration, and more
- Networking: Virtual Private Cloud (VPC), Cloud Load Balancing, Cloud Armor, Cloud CDN, Cloud NAT, Cloud Interconnect, Cloud VPN, Cloud DNS, Network Service Tiers, Network Telemetry
- Security: Access Transparency, Cloud Identity, Cloud Data Loss Prevention, Cloud Key Management Service, Cloud Security Scanner, and more
- Storage: Cloud Storage, Persistent Disk, Cloud Filestore, and more

A cloud database is a database that typically runs on a cloud computing platform, and access to the database is provided as-a-service. Database services take care of scalability and high availability of the database. Database services make the underlying software-stack transparent to the user.

2.3 Part 3: GCP SQL Database

Google Cloud database services are fully managed, scalable database services to support all your applications. GCP is rounding out its stable of managed database services as it on boards more large enterprises.

Managed database services are increasingly popular as enterprises aim to abstract the

underlying infrastructure and connect with databases via application programming interfaces.

Where do I store my stuff?

Object	In-memory	Non-relational	Relational	Warehouse		
 Cloud Storage Binary or object data Images, media serving, backups	 Cloud Memorystore (beta) Web/mobile applications, gaming Cache, game state, user sessions	 Cloud Datastore Hierarchical, mobile, web User profiles, Game State	 Cloud Bigtable Heavy read + write, events AdTech, financial, IoT	 Cloud SQL MySQL, PostgreSQL CMS, eCommerce	 Cloud Spanner RDBMS+scale, HA, global Transactions, Ad/Fin/MarTech	 BigQuery Enterprise Data Warehouse Analytics, Dashboards
						

<http://www.knowstuff.org/2018/04/google-cloud-platform-adds-more-managed-database-services/>

Cloud SQL

Google Cloud Database Services comes as part of Google's cloud platform services, and is the last of the big name cloud providers we'll mention here. There are a lot of options for users to choose from, not relational vs non-relational ones. The Cloud SQL option provides managed support for PostgreSQL & MySQL, while the BigTable option provides a petabyte-scale, fully managed NoSQL database service for large analytical and operational workloads.


Cloud SQL
 Cloud SQL is a fully managed database service that makes it easy to set up, maintain, manage, and administer your relational MySQL and PostgreSQL databases in the cloud.
[View cloud sql →](#)


Cloud Bigtable
 NoSQL database service for use cases where low latency reads and high throughput writes, scalability, and reliability are critical.
[View cloud bigtable →](#)


Cloud Spanner
 Cloud Spanner is a mission-critical, scalable relational database service, built to support transactions, strong consistency, and high availability across regions and continents.
[View cloud spanner →](#)


Cloud Memorystore
 Cloud Memorystore is a fully managed in-memory data store service for Redis built on scalable, more secure, and highly available infrastructure.
[View cloud memorystore →](#)


Cloud Firestore
 Cloud Firestore is a fast, fully managed, serverless, cloud-native NoSQL document database that simplifies storing, syncing, and querying data for your mobile, web, and IoT apps at global scale. Cloud Firestore is the next generation Cloud Datastore.
[View cloud firestore →](#)


Firebase Realtime Database
 The Firebase Realtime Database is a cloud-hosted NoSQL database that lets you store and sync data between your users in real time.
[View firebase realtime database →](#)

<https://cloud.google.com/sql/>

Google control your database, so you can concentrate on your applications. Cloud SQL is ideal for WordPress sites, e-commerce applications, CRM tools, and any other application that is compatible with MySQL, PostgreSQL, or SQL Server.

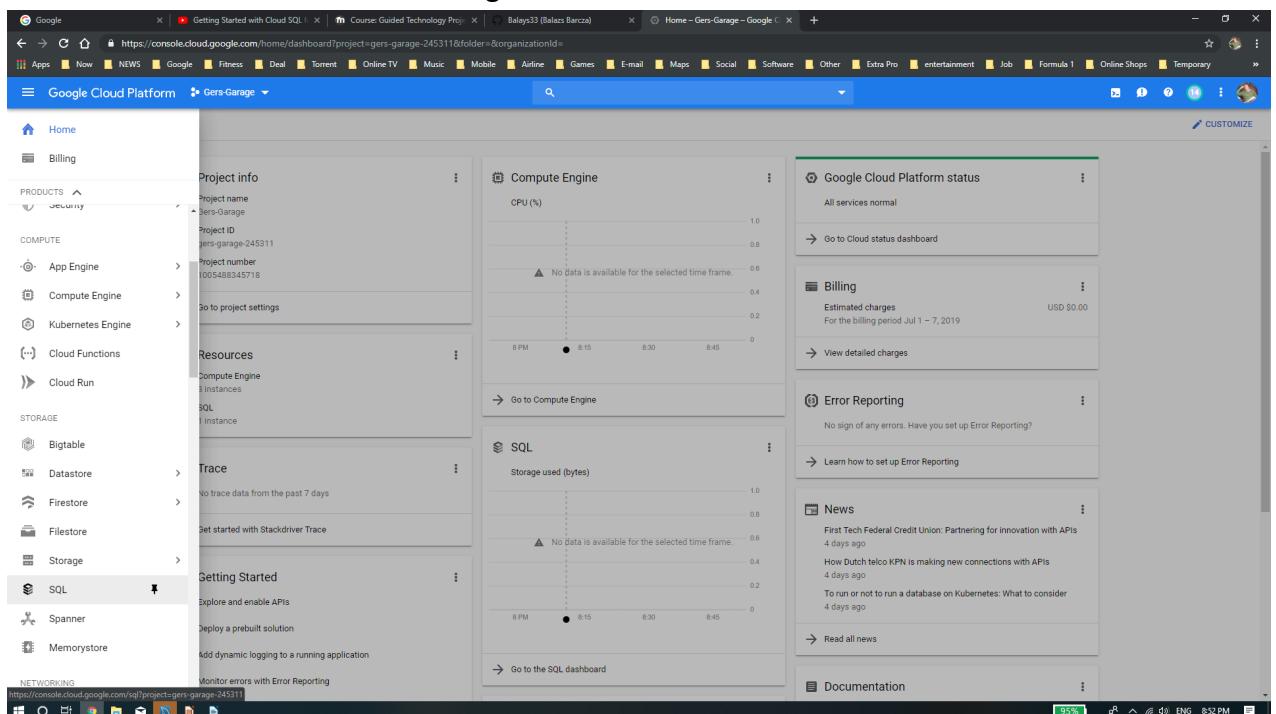
Cloud SQL is simple to use. It does not need any software installation. It automates all your backups, replication, patches, and updates.

Cloud SQL delivers high performance and scalability with up to 10 TB of storage capacity.

Simply configure replication and backups to protect your data. The database is highly available, and automatically encrypted.

Step by step setting up cloud SQL:

1. Create SQL instance with Google Cloud



Google Cloud navigation bar SQL icon

The google give to use to choose different applications, We can create virtual machines or storage etc. This interface is easy to use and clear design. I like because I get lager working place and If I want to use other service I can find the navigation bar always. The platform easy to set up and personal.

The screenshot shows the Google Cloud Platform SQL interface. At the top, it says "Choose your database engine". There are two main options: "MySQL Versions: 5.6, 5.7" with a "Choose MySQL" button, and "PostgreSQL Versions: 9.6, 11" with a "Choose PostgreSQL" button. Below these options, there is a note: "For First Generation MySQL Instances, click here".

We can create MySQL instance or PostgreSQL instance. In my project I will use MySQL because I have experience and I have created my database with MySQL workbench.

The screenshot shows the "Create a MySQL Second Generation instance" form. It includes fields for "Instance ID" (ger-garage2), "Root password" (linuxbb33), "Location" (europe-west4), "Region" (europe-west4), "Zone" (Any), "Database version" (MySQL 5.7), and "Configuration options". The configuration options are expanded to show:

- Set connectivity**: Public IP enabled
- Configure machine type and storage**: Machine type is db-n1-standard-1. Storage type is SSD. Storage size is 10 GB, and will automatically scale as needed.
- Enable auto backups and high availability**: Automatic backups enabled. Binary logging enabled. Not highly available.
- Add database flags**: No flags set
- Set maintenance schedule**: Updates may occur any day of the week. Cloud SQL chooses the maintenance timing.
- Add labels**

We can setup basic parameters with this panel. We can give name of the instance. We can setup password, and the location of the SQL database. We should choose the location but We should leave out the zone any and the Google Cloud will choose the best fit to the project. We can setup the connections (private and public IP).

We can create size of the storage and configurations of the machine. (bigger size better but price is higher) The storage automaticity increase.

Other important We can set up when will want to make backup and Failover replica.

High availability

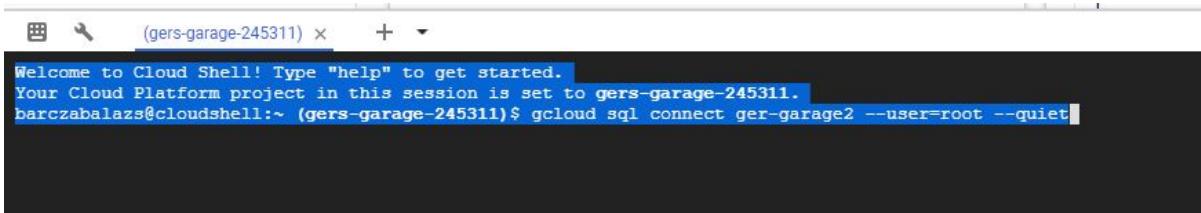
Recommended for all production instances to improve fault tolerance. Failover replica is hosted in a different zone from the master and is billed as a separate instance. [Learn more](#)
Create failover replica

Enter an ID for your failover replica. ID is permanent. Use lowercase letters, numbers and hyphens. Start with a letter.

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The screenshot shows the 'OVERVIEW' tab of a MySQL instance. At the top, there are buttons for EDIT, IMPORT, EXPORT, RESTART, STOP, DELETE, and CLONE. Below that, it says 'database-ger-garage' and 'MySQL Second Generation master'. A note indicates 'Instance is being updated. This may take a few minutes. While this operation is running, you may continue to view information about the instance.' The 'OVERVIEW' section includes tabs for CPU utilization, CONNECTIONS, USERS, DATABASES, BACKUPS, REPLICAS, and OPERATIONS. The CPU utilization chart shows no data for the current time interval. The CONNECTIONS section shows a public IP address (35.204.130.200) and an instance connection name (gers-garage-245311-europe-west4:database-ger-garage). The Configuration section shows 1 vCPU, 3.75 GB memory, and 10 GB SSD storage. It also notes that the database version is MySQL 5.7 and auto storage increase is enabled. The OPERATIONS section lists several update operations from July 2019, all marked as 'Update finished'. There are links to 'View all operations' and 'View MySQL error logs'.

This page gives information about the instance details. We can start or stop the instance. We can connect to the Google shell. There are many ways to connect to the instance. Within GCP, for example, we could use App Engine, Computer Engine or Container Engine. We can connect anywhere by authorizing IP addresses or using Cloud SQL proxy. Google shell provides command line access from the browser.



This is the command shell.

"

Welcome to Cloud Shell! Type "help" to get started. Your Cloud Platform project in this session is set to **gers-garage-245311**.
barczabalazs@cloudshell:~ (gers-garage-245311)\$ gcloud sql connect ger-garage2 --user=root --quiet^C

gcloud sql connect ger-garage2 --user=root --quiet

```
MySQL [test]> Create table test.customers( contact_id INT NOT NULL AUTO_INCREMENT, first_name VARCHAR(25), last_name VARCHAR(30) NOT NULL, birthday DATE, har(200), customer_password int(7), primary key (contact_id) );
Query OK, 0 rows affected (0.04 sec)

MySQL [test]>
```

Create table in GCP shell.

```
MySQL [test]> INSERT INTO test.customers ( first_name, last_name, birthday, Mobile_Number, customer_email, customer_comment, customer_password )
->     VALUES
->     ( 'Justin', 'Miller', '2008-7-04', 936-447-8517, 'JustinMMiller@dayrep.com', 'Just For Feet', 66174090 );
Query OK, 1 row affected (0.02 sec)

MySQL [test]>
```

Insert data in to the Database

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```
MySQL [test]> select * from customers;
+-----+-----+-----+-----+-----+-----+-----+
| contact_id | first_name | last_name | birthday | Mobile_Number | customer_Email | customer_Comment | customer_Password |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | Justin | Miller | 2008-07-04 | -8028 | JustinMMiller@dayrep.com | Just For Feet | 66174090 |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

MySQL [test]> █
```

```
select * from customers;
```

3 System Analysis and Design:

The overall aim of this chapter is to answer the questions – exactly what is the application supposed to do? It can include the following, where relevant:

- Functional Requirements

o Detailed description of the functionality of the proposed system. This should be comprehensive and exact, break up the application into subsystems.

o Diagrams – use Case diagrams, Wire frames, with text descriptions

- Data Requirements

o An overview of the entities and data in the system, and what data needs to be stored

o Diagrams – an Entity-Relationship Diagram

- User Interface Design

o This should contain an argument as to how this suggested interface supports each of the use cases specified in the analysis

o Diagrams – Screen designs, either pen-and-paper or computer drawn of how the user interface will appear

- Functional Design

o Functional design should model both the structure of each software component in the systems, and also how they interact with each other.

o Diagrams – detailed class diagram and an Interaction Diagram to show the interaction between objects in the system

- Data Design

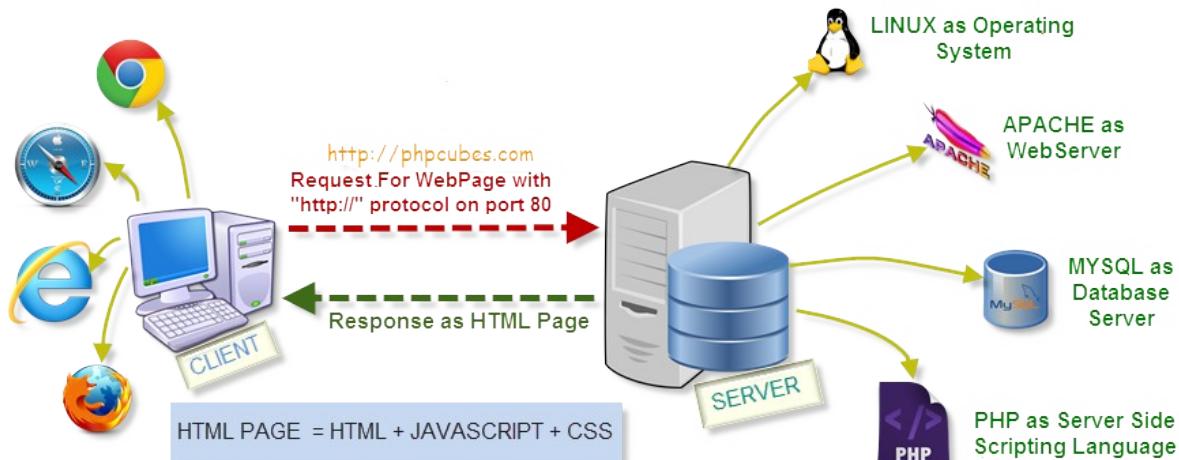
o Whether to be implemented as a database or some other central data repository, a detailed design of the data storage components should be presented

o Diagrams – Normalised database tables

3.1 Part 1: Functional Requirements

Analysis:

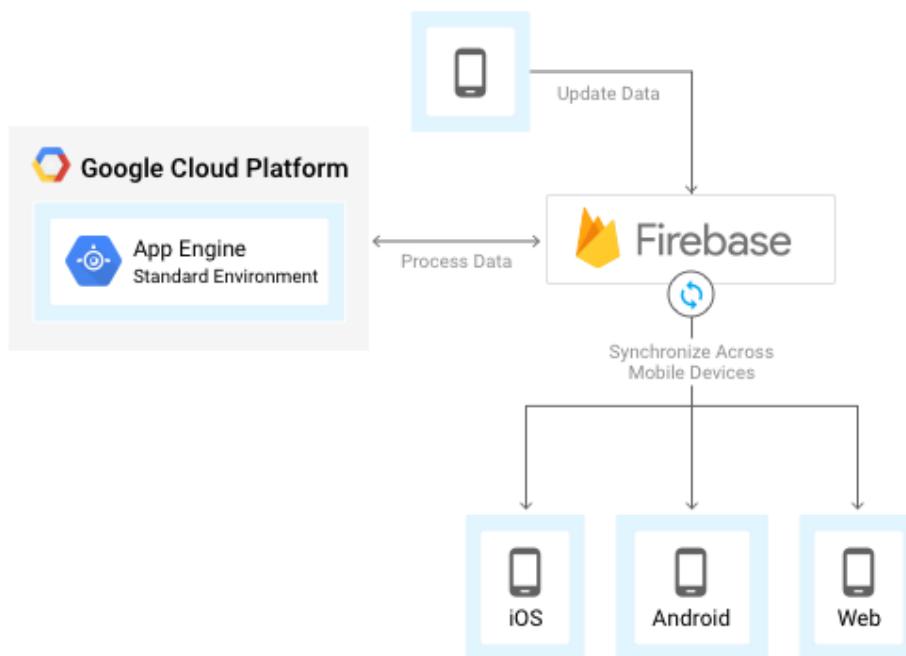
Gers has a small service company, and He is selling parts and maintenance vehicle. He needs to be online to organize the booking, and the costumers have to manage and book service. The thesis project is aiming for developing a useful tool for project website and application to manage the online booking system.



<https://people.rit.edu/~agy5732/140/proj2/http>

This application has to increase sales and has to provide what the customers needs. We have to break down the application into subsystems. I have used the Firebase service and I have broken up small components. I have to select a design pattern. Building a backend service for a mobile app is similar to building a web-based service, with some additional requirements:

- Limit on-device data storage.
- Synchronize data across multiple devices.
- Handle the offline case gracefully.
- Send notifications and messages.
- Minimize battery drain.



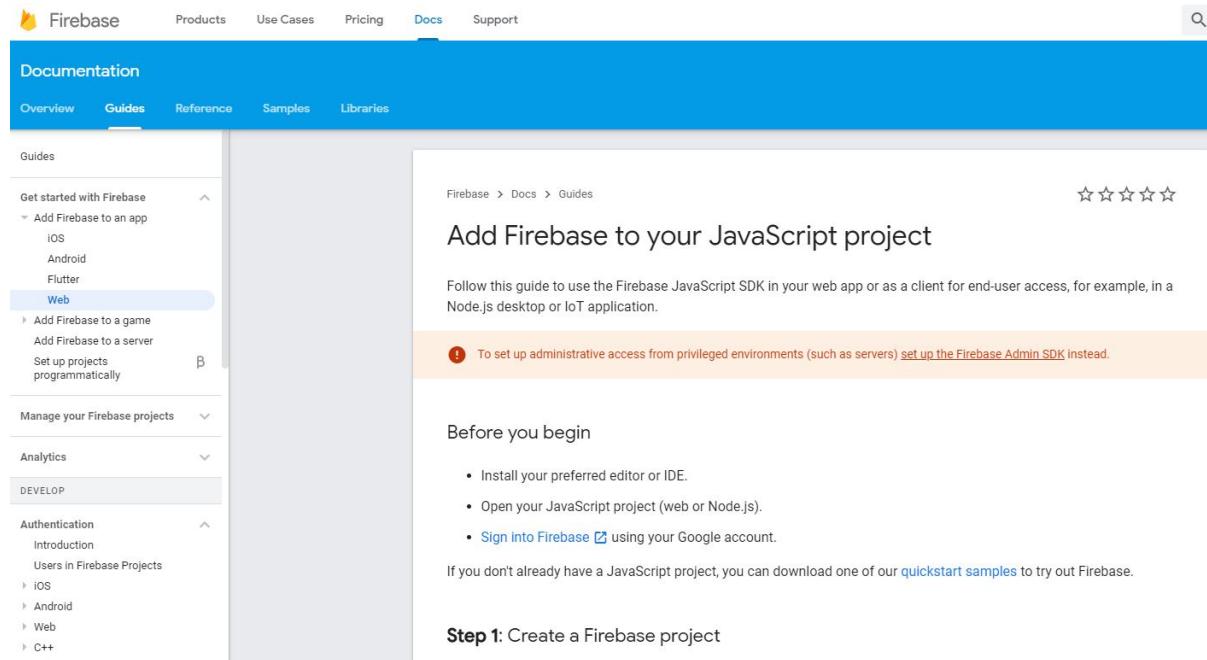
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<https://www.slideshare.net/KasperLoevborgJensen/introduction-to-firebase-with-android-and-beyond>

This is web-based design but the website is developed to the mobile-first.

This is a help to make the website scale and It helps to manage the different size of the screen.

I hosted the website on Firebase because Is free and It is well documented.



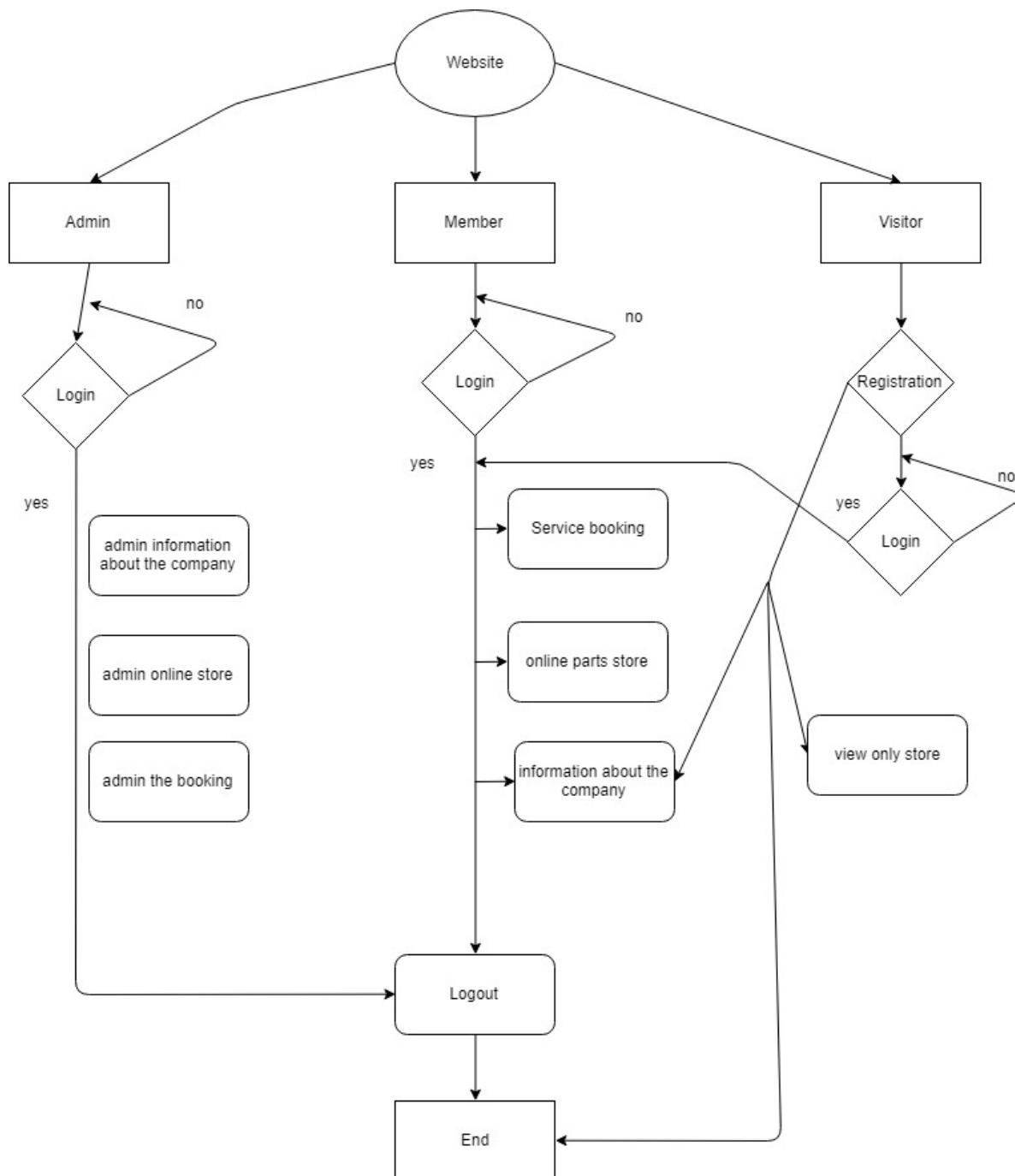
The screenshot shows the Firebase Documentation website. The navigation bar includes links for Products, Use Cases, Pricing, Docs (which is underlined), and Support. A search icon is also present. The main menu has sections for Overview, Guides (which is selected and highlighted in blue), Reference, Samples, and Libraries. On the left, a sidebar titled 'Guides' contains a tree view of documentation: 'Get started with Firebase' (with 'Add Firebase to an app' expanded), 'Manage your Firebase projects', 'Analytics', and 'DEVELOP' (with 'Authentication' expanded). Under 'Authentication', there are links for 'Introduction', 'Users in Firebase Projects', and platforms like iOS, Android, Web, and C++. The main content area shows the 'Add Firebase to your JavaScript project' guide. The title is 'Add Firebase to your JavaScript project'. Below it, a note says 'Follow this guide to use the Firebase JavaScript SDK in your web app or as a client for end-user access, for example, in a Node.js desktop or IoT application.' A warning message in an orange box states: 'To set up administrative access from privileged environments (such as servers) [set up the Firebase Admin SDK instead](#)'. Below this, a section titled 'Before you begin' lists steps: 'Install your preferred editor or IDE.', 'Open your JavaScript project (web or Node.js).', and 'Sign into Firebase [using your Google account](#)'. A note at the bottom says 'If you don't already have a JavaScript project, you can download one of our [quickstart samples](#) to try out Firebase.' The page has a rating of five stars.

Firebase documentation.

I want to host the SQL in the Google Cloud Platform GCP so It has a support to connect the database with the main website. The firebase easy to scale and give more functions to the Web app.

Firebase is a fully managed platform for building iOS, Android, and web apps that implements automatic data synchronization, authentication services, messaging, file storage, analytics, and more. Starting with Firebase is an efficient way to build or prototype mobile backend services.

- Firebase apps that need a backend service to modify the synchronized data.
- Backend services that run regularly to process or analyze Firebase data.



This graph shows how the website can be accessed with different users.

Three types of user can have the web app.

admin: This person can be Ger or his colleagues who have admin access.

They can modify the website and get information, modified about the booking status and can change the online store manager the staff.

visitor: This user who does not have registration so He or she only can get basic information about the company, can check the service and price and only store, but can not make online shopping and booking.

Member: This person has an account and can log in and out. The person can make a booking and check the online store and buy products.

Programming Language:

I had to choose the programming language. My choose was the HTML and CSS to create webpages. I

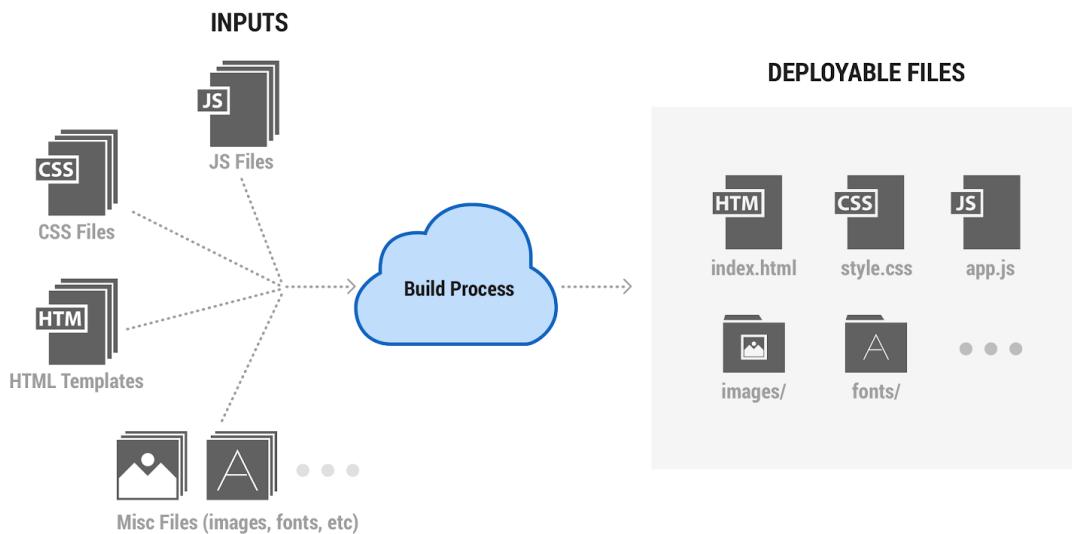
have to write a client-side web application.

JavaScript and PHP good chose. If you want to use the latest and greatest features of the language before they are supported in all browsers.

I have used MySQL to create the database.

Build Process:

The main tasks of the build process are code compilation, files. The end result will be an index.html and the required JavaScript, CSS, and other static assets, like images and fonts, that are needed to deploy the web application.



3.2 Part 2: User Interface Design

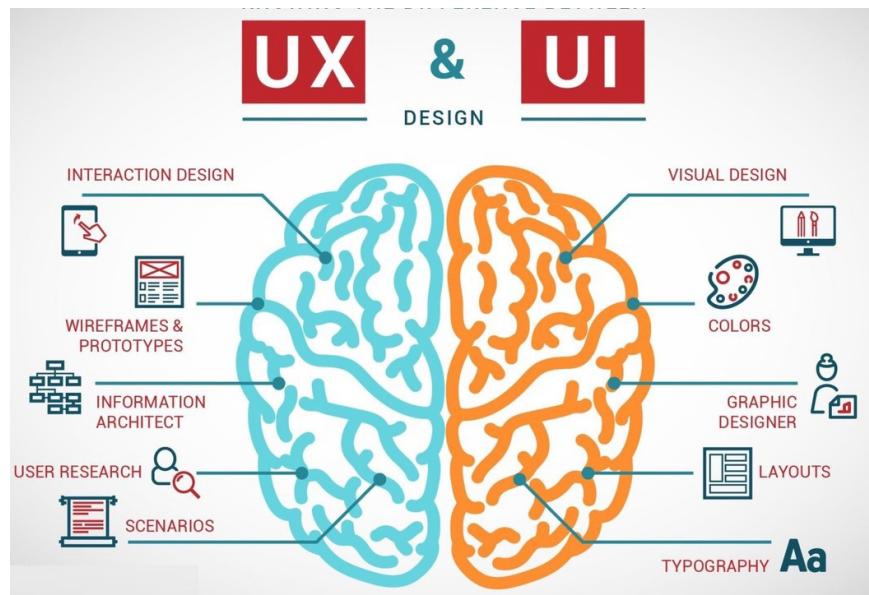
11. This should contain an argument as to how this suggested interface supports each of the use cases specified in the analysis

- o Diagrams – Screen designs, either pen-and-paper or computer drawn of how the user interface will appear

UI (user interface) is the process of designing interface in software and It is focused on looks or style. The well-designed software easy to use and the user will spend more time on the app. The UI design is graphical user interfaces but it can be voice-controlled.

The main access points to the software are the user interface, where the users interact with designs. Graphical user interfaces (GUIs) are designs' control panels. It van be voice-controlled interfaces, It is going to be the future because the users can control the software without using the graphic interface. We can make 2d or 3d graphical interface but my case it is only 2D.

I should create the illusion that users aren't interacting with a website so much as they're trying to attain goals directly and as effortlessly as possible. My design should have as many enjoyable features as are suitable.

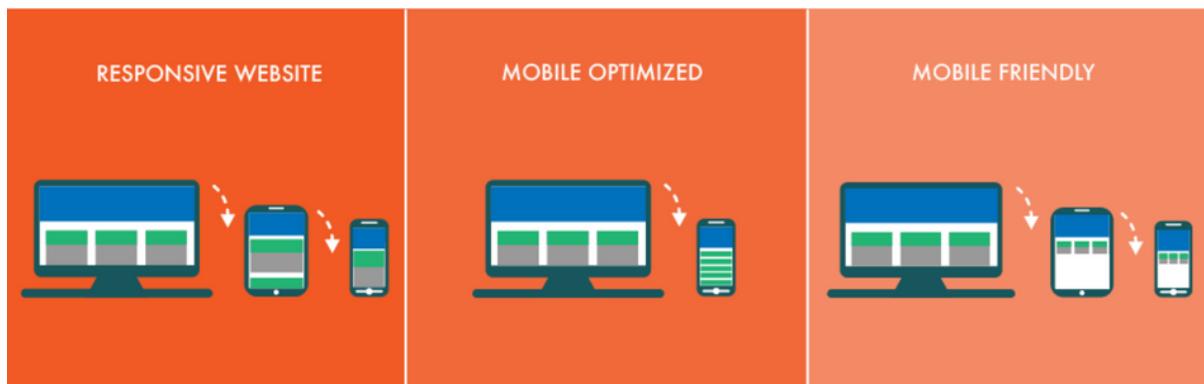


<https://uxdesign.cc/why-ux-and-ui-should-remain-separate-7d6e3addb46f>

Interface design is one of the key elements of the project. If the website or the app is too slow the user won't use the service. If the user interface is not easy to understand We will have the same problem. It has to design user-friendly and clear design. It has to be mirror the company profile so It was important to use the company logo colours. I have chosen the white and blue colour to make the web app visible.

We have to be careful and decide what type of website we would like to design.

MOBILE RESPONSIVE VS. OPTIMIZED VS. FRIENDLY: WHAT'S THE DIFFERENCE?



<https://compulse.com/mobile-responsive-vs-optimized-vs-friendly-whats-difference/>

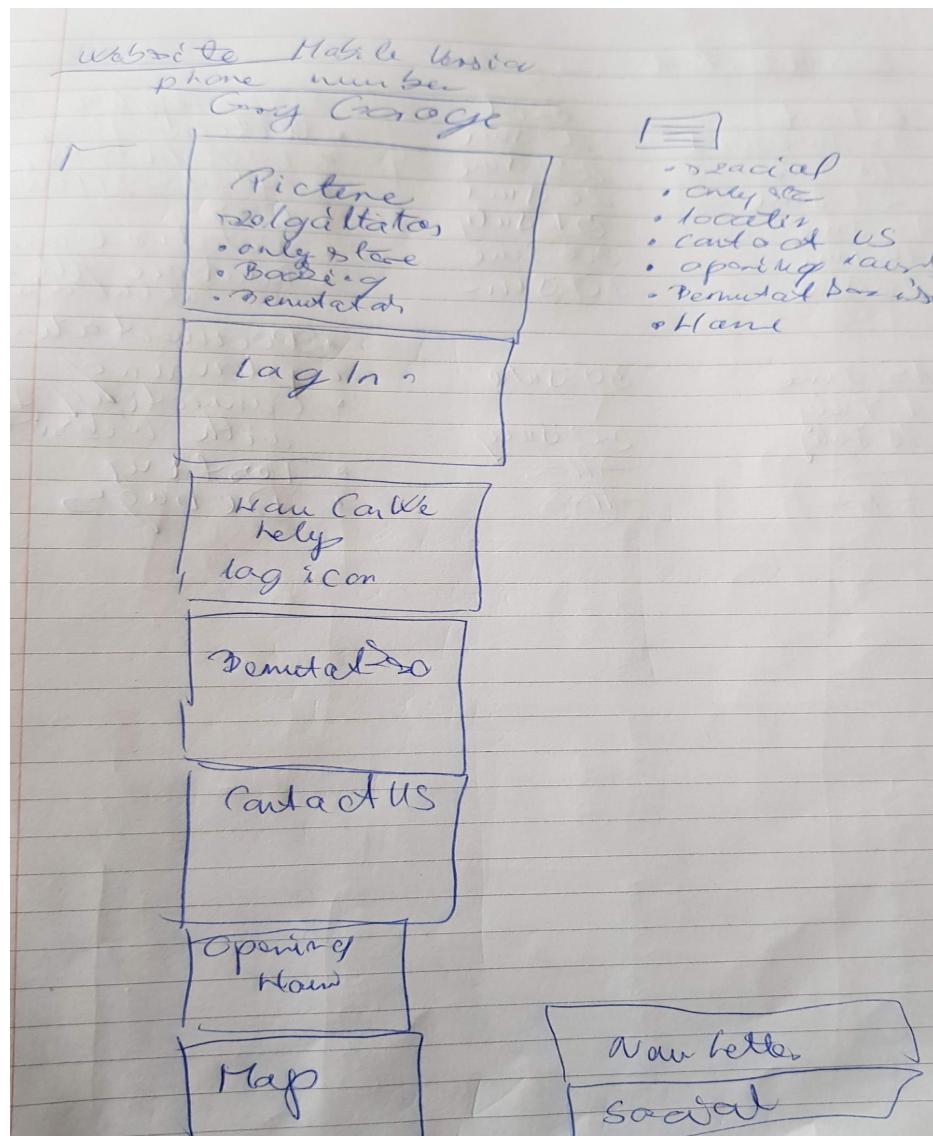
The successful businesses have to have a user-friendly website in 2019. More the more people use mobile phones than ever before, so the website has to be the response to the smartphone. I can design the website to mobile devices: mobile responsive, mobile-optimized and mobile-friendly.

1. The mobile responsive website is the most user-friendly. This type of website is design to a different size. This is focused on the mobile and tablet and PC interfaces.

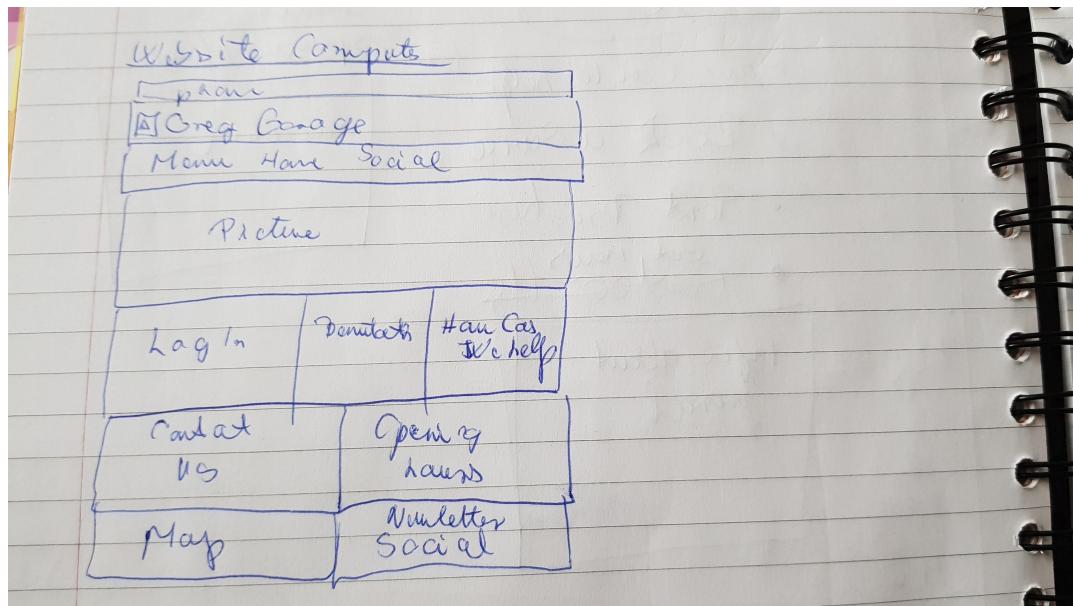
2. A mobile-optimized site is build to the mobile user. It can use the PC platform but not the best user-friendly.
3. A mobile-friendly design is the most limited “friendly”. These websites will still be convenient to mobile onlookers, but they aren’t designed for the optimal user activity.

Why You Need a Mobile-Friendly Website in 2019?

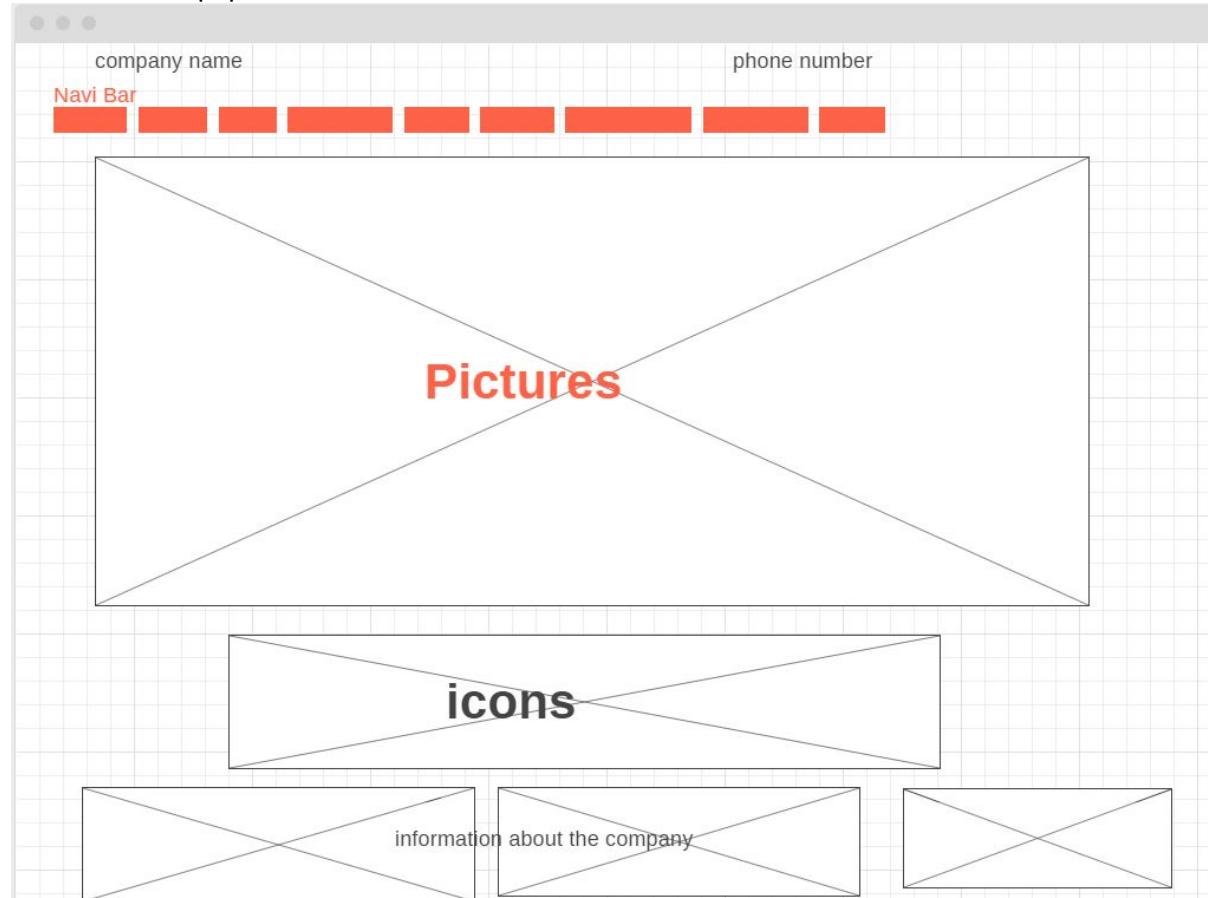
- A mobile-friendly design makes a website more available.
- Improved user experience.
- Responsive website architecture is cost-effective.
- A mobile-friendly website increases sales.
- A mobile improved site engages Google ranking.



This is the mobile -friendly version design. My website has to be adjusted to the different screen size so I have focused the mobile version.



Scratch on the paper wireframe.



This is the early plan basic scratch about the website.

I did not plan too many separate pages, I wanted to give all of the information on the main page and a couple of pages to future growth.

I have to integrate the Navi bar all of the pages because it is helps the user easy navigation.

When we are designing a website we have a couple of great tools to speed up the design progress. We can use the CSS and we can program all of the small design parts of the website. We can use CSS framework directed at responsive , or we can use those optional together. I have used two frameworks, one of the bootstrap and another one the google material design.

Bootstrap:

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation and other interface components. Build responsive, mobile-first projects on the web with the world's most popular front-end component library. Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful plugins built on jQuery.



The screenshot shows a snippet of HTML code for a Bootstrap navbar. The code includes a logo icon and the word "Bootstrap". The code is syntax-highlighted with colors for different elements like tags and attributes.

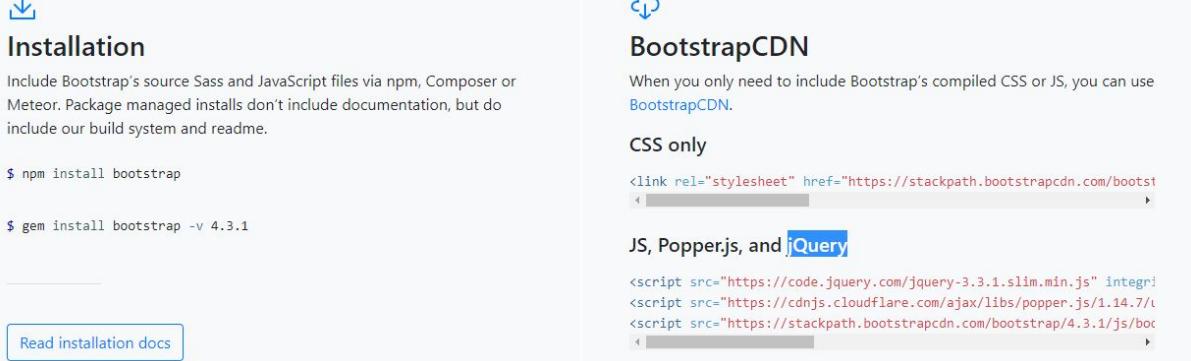
```
<!-- Image and text -->
<nav class="navbar navbar-light bg-light">
  <a class="navbar-brand" href="#">
    
    Bootstrap
  </a>
</nav>
```

Adding images to the .navbar-brand will likely always require custom styles or utilities to properly size.

<https://getbootstrap.com/>

You can use the bootstrap in two ways. You can install to your local computer or you include in your HTML file the bootstrap components.

style-sheet and the jQuery.



The screenshot shows two sections: "Installation" and "BootstrapCDN". The "Installation" section provides instructions for installing Bootstrap via npm or Composer. The "BootstrapCDN" section provides a link to the compiled CSS and JS files.

Installation
Include Bootstrap's source Sass and JavaScript files via npm, Composer or Meteor. Package managed installs don't include documentation, but do include our build system and readme.

```
$ npm install bootstrap
$ gem install bootstrap -v 4.3.1
```

[Read installation docs](#)

BootstrapCDN
When you only need to include Bootstrap's compiled CSS or JS, you can use [BootstrapCDN](#).

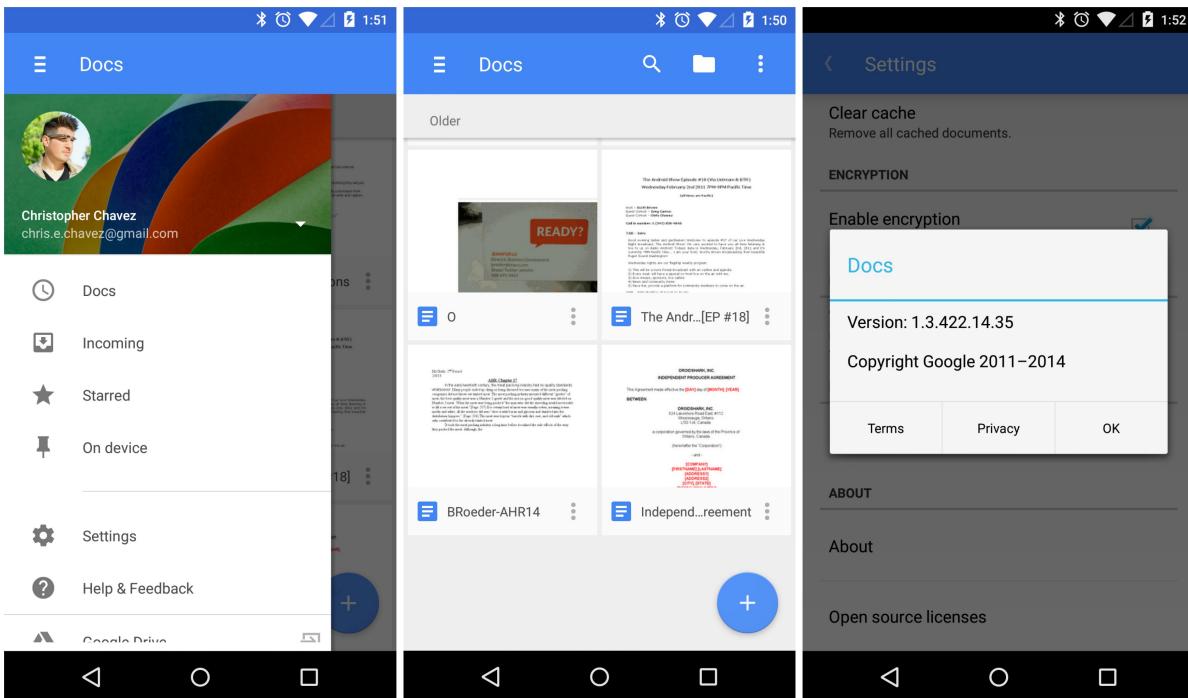
CSS only
`<link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css" integrity="...">`

JS, Popper.js, and jQuery
`<script src="https://code.jquery.com/jquery-3.3.1.slim.min.js" integrity="...">
<script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.7/umd/popper.min.js" integrity="...">
<script src="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/js/bootstrap.min.js" integrity="...">`

Google material design:

Material Design is a design language created for Google Android's new OS. It is originally focused on touch-based mobile app design it should be possible to separate the same ideas into web design. It has online documentation and it is very detailed. Google has created a material design language. This design is focus to make the Android app more user-friendly. It helps the developer make faster android interface. Mobile interfaces are created out of layered material objects like rectangular bars or circular buttons. Content(text, imagery, video) is laid flat onto

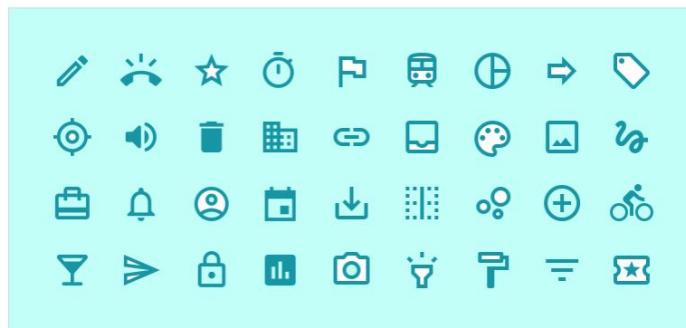
the material. If you use the Google material design tools you will find a lot of icons, buttons, text box, the navbar. You can make the app.



<https://phandroid.com/2014/10/29/google-drive-docs-slides-and-sheets-all-updated-with-material-design/>

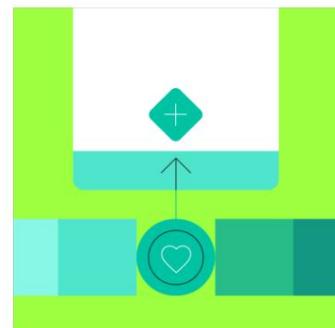
Material articles

Make progress faster, with these helpful articles



System icons

System icons symbolize common actions, files, devices, and directories. Each icon is reduced to its minimal form, expressing essential characteristics.



Generate custom color palettes

Craft a unique color scheme for your brand with this online tool.

<https://material.io/design/>

How you can access the Material Lite CSS.

You can include the code all of the HTML page or you can download and host yourself.

- HOSTED

Just add the following <link> and <script> elements into your HTML pages (27kB gzipped):

```
<link rel="stylesheet" href="https://fonts.googleapis.com/icon?family=Material+Icons">
<link rel="stylesheet" href="https://code.getmdl.io/1.3.0/material.indigo-pink.min.css">
<script defer src="https://code.getmdl.io/1.3.0/material.min.js"></script>
```

- DOWNLOAD

- BUILD
- BOWER
- NPM

3.3 Part 3: Functional & Data Design

What is the database?

The software used to manage and manipulate that structured information is called a DBMS (Database Management System). This is one component of DBMS. It is basically a simple list of information. The first step I have to find the entities and relationships. The entities I store information about the database, and the relationships are the links between these entities. I have used in my project the excel to create tables and I have designed the ER diagram with MySQL workbench.

Normalization Rule

Normalization rules are divided into the following normal forms:

First Normal Form

Second Normal Form

Third Normal Form

BCNF

Fourth Normal Form

| Data Base | | | |
|---------------|----------------|--------|--|
| Customer Name | Contact number | E-mail | |
| First Name | Family name | mobile | |
| | | | |

| Vehicle | | | |
|------------|------------------------|--------|------------------|
| Type | Engine Size | Fuel | Body type |
| Pass | 1389 CC | Petrol | 5 door Hatchback |
| Motorcycle | ? | Diesel | ? |
| Coupe | ? | Hybrid | ? |
| Car | Vehicle licence Number | Date | Car Brand |
| grey | 05-D-12345 | 2001 | Opel |
| 7 | 131-W-12345 | 2019 | Tatai min |
| | | | 40 Brand |

| Booking Required | | | + other
not at the
base |
|------------------|---------------------|--------------|-------------------------------|
| Book
number | Required
Service | Base
Cost | Extra
Cost |
| 1 | Annual Services | 200€ | |
| 2 | Major Services | .. | |
| 3 | Repair / Fault | .. | |
| 4 | Major Repair | .. | |

| Customer Component | | |
|--------------------|------------|--|
| Staff
number | Staff name | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |

| Date / Time | | |
|-------------|-------|----|
| Day | Time | |
| Monday | 08-09 | 62 |
| Tuesday | 09-10 | 73 |
| Wednesday | 10-11 | 84 |
| Thursday | 11-12 | 9 |
| Friday | 12-13 | 10 |
| Saturday | 13-14 | 11 |

| Part / ITEM | | | cost |
|-------------|-------------|--|------|
| Part number | Part type | | |
| 1 | Brake shoe | | |
| 2 | Brake fluid | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
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| 7 | | | |
| 8 | | | |
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Guided Technology Project – Ger's Garage | SB18002 Balazs Barcza

| Ger's Garage UNF | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---------------|-------------------|-------------------|-----------------|--------------------------------|-----------------|---------------|---|--------------|--------------|-------------------|-------------------------|--|---|--------------|---------------|-----------|------------|---|---------------|----------------|------|--------|
| Database | | | | | | | | | | | | | | | | | | | | | | | |
| Booking code number | Customer Code | Customer Password | Customer Name | Customer number | Customer mobile | Customer e-mail | Customer Bday | Comments | Vehicle type | Vehicle Made | Vehicle year | Vehicle licence details | Vehicle engine type | Booking Required | Booking Cost | Items / Parts | Item Cost | Date / Day | Time | Number of day | Date Month | Year | Staffs |
| | | | | | | | | 1. motorbikes
2. cars
3. small vans
4. small buses | | | | | 1.diesel
2.petrol
3.hybrid
4.electric | 1. Annual Service
2. Major Service
3. Repair / Fault
4. Major Repair | | | | | 1. Monday
2.Tuesday
3.Wednesday
4.Thursday
5.Friday
6.Saturday
7.Sunday | | 1, 2, 3,
4, | | |
| 1 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gergarage.com | 02/27/89 | etc | 2 | Ford Fiesta | 2014 | 14D2345 | 1 | 2 | 200 | 12 | 23 | 2 | 10 | 22 | 3 | 2019 | 3 | |
| 2 | 222 | citron | Joe M. Rosales | 900-867-4863 | JoeM.Rosales@gergarage.com | 02/27/89 | etc | 2 | skoda fabia | 2019 | 19ID2343 | 4 | 5 | 300 | 10 | 100 | 3 | 11 | 21 | 3 | 2019 | 2 | |
| 3 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gergarage.com | 02/27/89 | etc | 2 | BMW | 2014 | 182D4345 | 3 | 1 | 190 | 33 | 150 | 1 | 10 | 22 | 3 | 2019 | 4 | |
| 4 | 322 | maina | Shawn C. Anderson | 570-592-3221 | Shawn.C.Anderson@gergarage.com | 05/10/57 | etc | 12 | yamaha sp6 | 2016 | 16W1234
17E467 | 22 | 32 | 123 500 | 22 44 55 | 123 32 56 | 5 2 | 12 1 | 12 12 | 3 | 2019 | 31 | |

This is the database Unnormalized Form. This table hold all of the entities

- customers
- vehicle
- booking required
- staff
- date/time
- parts/items
- booking status
- etc

Guided Technology Project – Ger's Garage | SB18002 Balazs Barcza

| Ger's Garage 1NF | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---------------|--|-------------------|------------------------|---------------------------------|--------------|-------------------|--------------|--------------|--------------|-------------------------|---------------------|------------------|--------------|---------------|-----------|------------|------|---------------|------------|------|--------|------------------|
| Database | | First normal form (1NF) is a property of a relation in a relational database. A relation is in first normal form if and only if the domain of each attribute contains only atomic (indivisible) values, and the value of each attribute contains only a single value from that domain. | | | | | | | | | | | | | | | | | | | | | |
| Booking code number | Customer Code | Customer Password | Customer Name | Customer mobile number | Customer e-mail | Customer Bay | Customer Comments | Vehicle type | Vehicle Made | Vehicle year | Vehicle licence details | Vehicle engine type | Booking Required | Booking Cost | Items / Parts | Item Cost | Date / Day | Time | Number of day | Date Month | Year | Staffs | Vehicle statuses |
| 1 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gersgarage.com | 02/27/89 | etc | 2 | Ford Fiesta | 2014 | 14D2345 | 1 | 2 | 200 | 12 | 23 | 2 | 10 | 22 | 3 | 2019 | 3 | 2 |
| 2 | 222 | citron | Joe M. Rosales | 909-867-4863 | JoeM.Rosales@gersgarage.com | 02/27/89 | etc | 2 | skoda fabia | 2019 | 191D2343 | 4 | 5 | 300 | 10 | 100 | 3 | 11 | 21 | 3 | 2019 | 2 | 1 |
| 3 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gersgarage.com | 02/27/89 | etc | 2 | BMW | 2014 | 182D4345 | 3 | 1 | 190 | 33 | 150 | 1 | 10 | 22 | 3 | 2019 | 4 | 4 |
| 4 | 322 | malina | Shawn C. Anderson | 570-592-5221 | Shawn.C.Anderson@gersgarage.com | 05/10/57 | etc | 1 | yamaha | 2016 | 16W1234 | 2 | 3 | 123 | 2255 | 123 | 5 | 12 | 12 | 3 | 2019 | 31 | 3 |
| 4 | 322 | malina | Shawn C. Anderson | 570-592-5221 | Shawn.C.Anderson@gersgarage.com | 05/10/57 | etc | 2 | opel | 2107 | 17E467 | 2 | 2 | 500 | 55 | 56 | 2 | 1 | 12 | 3 | 2019 | 31 | 5 |

First Normal Form

First Normal Form (1NF)

For a table to be in the First Normal Form, it should follow the following 4 rules:

It should only have single(atomic) valued attributes/columns.

Values stored in a column should be of the same domain

All the columns in a table should have unique names.

And the order in which data is stored, does not matter.

<https://www.studytonight.com/dbms/database-normalization.php>

| Ger's Garage 2NF | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---------------|---|-------------------|------------------------|---------------------------------|--------------|-------------------|--------------|--------------|--------------|-------------------------|---------------------|------------------|--------------|---------------|-----------|------------|------|---------------|------------|------|--------|------------------|---------------------|
| Database | | Second normal form (2NF) is a normal form used in database normalization. 2NF was originally defined by E.F. Codd in 1971. A relation is in the second normal form if it fulfills the following two requirements: (1.) It is in first normal form (1NF) | | | | | | | | | | | | | | | | | | | | | | |
| Booking code number | Customer Code | Customer Password | Customer Name | Customer mobile number | Customer e-mail | Customer Bay | Customer Comments | Vehicle type | Vehicle Made | Vehicle year | Vehicle licence details | Vehicle engine type | Booking Required | Booking Cost | Items / Parts | Item Cost | Date / Day | Time | Number of day | Date Month | Year | Staffs | Vehicle statuses | Booking code number |
| 1 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gersgarage.com | 02/27/89 | etc | 2 | Ford Fiesta | 2014 | 14D2345 | 1 | 2 | 200 | 12 | 23 | 2 | 10 | 22 | 3 | 2019 | 3 | 2 | |
| 2 | 222 | citron | Joe M. Rosales | 909-867-4863 | JoeM.Rosales@gersgarage.com | 02/27/89 | etc | 2 | skoda fabia | 2019 | 191D2343 | 4 | 5 | 300 | 10 | 100 | 3 | 11 | 21 | 3 | 2019 | 2 | 1 | |
| 3 | 123 | apple | Richard A. Addis | 843-371-9785 | RichardA.Addis@gersgarage.com | 02/27/89 | etc | 2 | BMW | 2014 | 182D4345 | 3 | 1 | 190 | 33 | 150 | 1 | 10 | 22 | 3 | 2019 | 4 | 4 | |
| 4 | 322 | malina | Shawn C. Anderson | 570-592-5221 | Shawn.C.Anderson@gersgarage.com | 05/10/57 | etc | 1 | yamaha | 2016 | 16W1234 | 2 | 3 | 123 | 2255 | 123 | 5 | 12 | 12 | 3 | 2019 | 31 | 3 | |
| 4 | 322 | malina | Shawn C. Anderson | 570-592-5221 | Shawn.C.Anderson@gersgarage.com | 05/10/57 | etc | 2 | opel | 2107 | 17E467 | 2 | 2 | 500 | 55 | 56 | 2 | 1 | 12 | 3 | 2019 | 31 | 5 | |

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| 2NF A | | | | | | | | | | | | | | | | | |
|---------------|-------------------|-------------------|------------------------|----------------------------|------------------|-------------------|---------------|-----------|------------|------|---------------|------------|------|--------|------------------|---------------------|---|
| Customer Code | Customer Password | Customer Name | Customer mobile number | Customer e-mail | Customer Bday | Customer Comments | | | | | | | | | | | |
| 123 | apple | Richard A. Addis | 843-371-9785 | RichardAAddis@j0uprade.com | 02/27/89 | etc | | | | | | | | | | | |
| 222 | citrom | Joe M. Rosales | 909-867-4863 | JoeMRosales@journpide.com | 02/27/89 | etc | | | | | | | | | | | |
| 322 | maina | Shawn C. Anderson | 570-592-5221 | ShawnCAnderson@armyspy.com | 05/10/57 | etc | 2 NF B | | | | | | | | | | |
| 2 NF B | | | | | | | | | | | | | | | | | |
| Customer Code | Vehicle type | Vehicle Made | Vehicle year | Vehicle engine type | Booking Required | Booking Cost | Items / Parts | Item Cost | Date / Day | Time | Number of day | Date Month | Year | Staffs | Vehicle statuses | Booking code number | |
| 123 | 2 | Ford Fiesta | 2014 | 14D2345 | 1 | 2 | 200 | 12 | 23 | 2 | 10 | 22 | 3 | 2019 | 3 | 2 | 1 |
| 222 | 2 | skoda fabia | 2019 | 191D2343 | 4 | 5 | 300 | 10 | 100 | 3 | 11 | 21 | 3 | 2019 | 2 | 1 | 2 |
| 123 | 2 | BMW | 2014 | 182D4345 | 3 | 1 | 190 | 33 | 150 | 1 | 10 | 22 | 3 | 2019 | 4 | 4 | 3 |
| 322 | 1 | yamaha | 2016 | 16W1234 | 2 | 3 | 123 | 22 | 123 | 5 | 12 | 12 | 3 | 2019 | 31 | 3 | 4 |
| 322 | 2 | opel | 2107 | 17E467 | 2 | 2 | 500 | 55 | 56 | 2 | 1 | 12 | 3 | 2019 | 31 | 5 | 4 |

Second Normal Form (2NF)

For a table to be in the Second Normal Form,

It should be in the First Normal form.

And, it should not have Partial Dependency.

<https://www.studytonight.com/dbms/database-normalization.php>

| Ger's Garage 3NF | | | | | | | | | | | | | |
|---|-------------------|-------------------|------------------------|----------------------------|---------------|-------------------|------------------|---------------------|---|------|----|---|---|
| Database | | | | | | | | | | | | | |
| The third normal form (3NF) is a normal form used in database normalization. 3NF was originally defined by E.F. Codd in 1971. Codd's definition states that a table is in 3NF if and only if both of the following conditions hold: The relation R (table) is in second normal form (2NF) | | | | | | | | | | | | | |
| 3NF A | | | | | | | | | | | | | |
| Customer Code | Customer Password | Customer Name | Customer mobile number | Customer e-mail | Customer Bday | Customer Comments | | | | | | | |
| 123 | apple | Richard A. Addis | 843-371-9785 | RichardAAddis@j0uprade.com | 02/27/89 | etc | | | | | | | |
| 222 | citrom | Joe M. Rosales | 909-867-4863 | JoeMRosales@journpide.com | 02/27/89 | etc | | | | | | | |
| 322 | maina | Shawn C. Anderson | 570-592-5221 | ShawnCAnderson@armyspy.com | 05/10/57 | etc | | | | | | | |
| 3NF C | | | | | | | | | | | | | |
| Vehicle licence details | Vehicle type | Vehicle Made | Vehicle year | Vehicle engine type | Customer Code | | | | | | | | |
| 14D2345 | 2 | Ford Fiesta | 2014 | 1 | 123 | 2 | 10 | 22 | 3 | 2019 | 3 | 2 | 1 |
| 191D2343 | 2 | skoda fabia | 2019 | 4 | 222 | 3 | 11 | 21 | 3 | 2019 | 2 | 1 | 2 |
| 182D4345 | 2 | BMW | 2014 | 3 | 123 | 1 | 10 | 22 | 3 | 2019 | 4 | 4 | 3 |
| 16W1234 | 1 | yamaha | 2016 | 2 | 322 | 5 | 12 | 12 | 3 | 2019 | 31 | 3 | 4 |
| 17E467 | 2 | opel | 2107 | 2 | 322 | 2 | 1 | 12 | 3 | 2019 | 31 | 5 | 4 |
| 3NF D | | | | | | | | | | | | | |
| Items / Parts | Item Cost | 3NF E | | | | | 3NF F | | | | | | |
| Vehicle licence details | Date / Day | Time | Number of day | Date Month | Year | Staffs | Vehicle statuses | Booking code number | | | | | |
| 14D2345 | 2 | 10 | 22 | 3 | 2019 | 3 | 2 | 100 | | | | | |
| 191D2343 | 3 | 11 | 21 | 3 | 2019 | 2 | 1 | 200 | | | | | |
| 182D4345 | 1 | 10 | 22 | 3 | 2019 | 4 | 4 | 300 | | | | | |
| 16W1234 | 5 | 12 | 12 | 3 | 2019 | 31 | 3 | 400 | | | | | |
| 17E467 | 2 | 1 | 12 | 3 | 2019 | 31 | 5 | 400 | | | | | |

Third Normal Form (3NF)

A table is said to be in the Third Normal Form when,

It is in the Second Normal form.

And, it doesn't have Transitive Dependency.

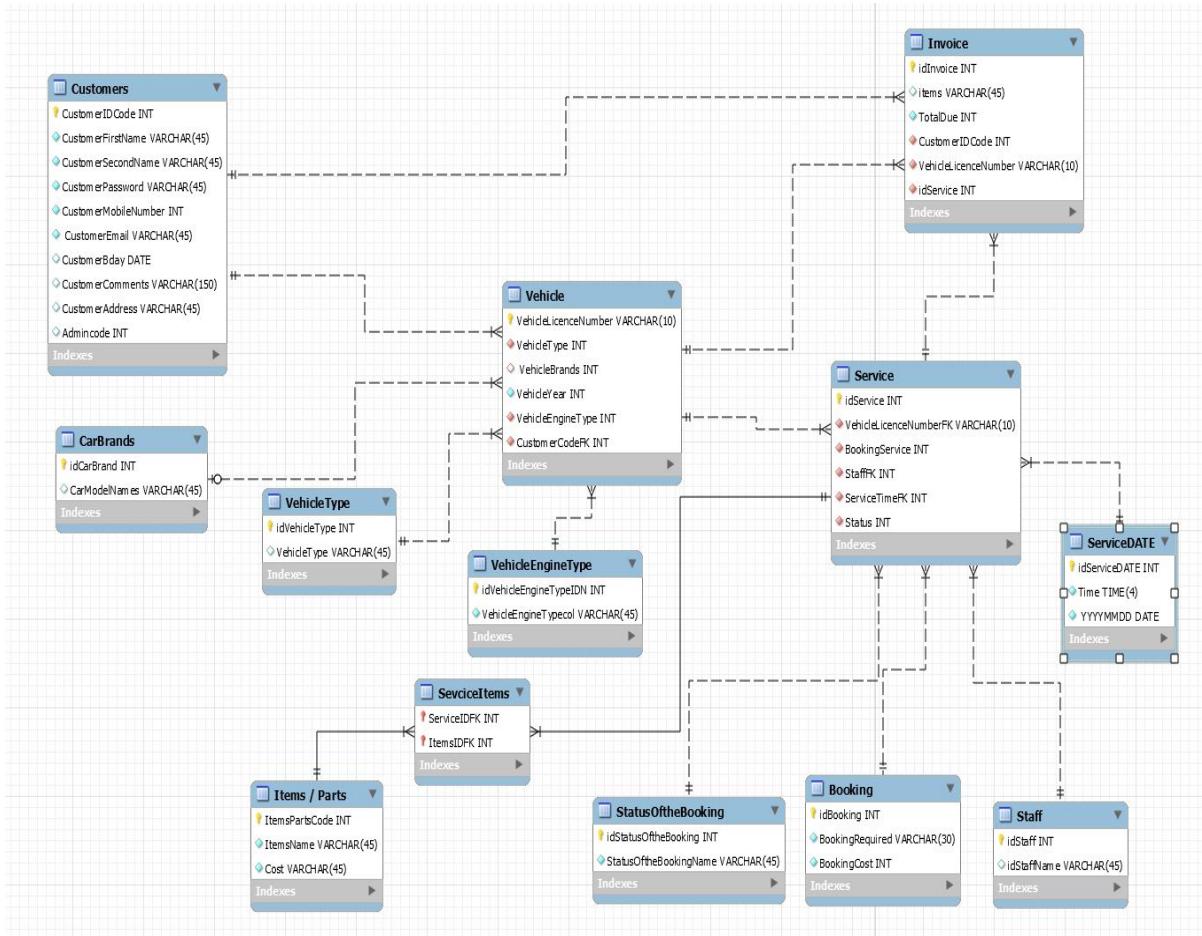
<https://www.studytonight.com/dbms/database-normalization.php>

I had to make ER diagram(Entity Relationship Diagram) to see how is look like my database.
Why we should use ER?

Entity-relationship diagram (ERD) shows the relationships of entity sets stored in a database. ER Diagrams are most often used to design or debug relational databases in the areas of software engineering, business information systems, education, and research. ER diagrams also are often used in connection with data flow diagrams (DFDs), which map out the flow of information for processes or systems.

I have used MySQL workbench to create my ER diagram. This software is really easy to use and very visible of the table connection.

The design shows the primary keys and foreign keys. I had a little issue when I have added data to my database because when I created the DB system I could not transfer all of the data.



4 Implementation of the system:

This chapter should detail how the learner implemented a working system based on their design. This should include the technologies used (languages, APIs, frameworks etc.) and how the system was implemented, based on the user and functional requirements identified during the analysis and design phase. This chapter should address any potential problems that could arise in the system and suggested or implemented solutions.

Possible areas for discussion in this chapter are:

- o Architecture considerations - e.g. are there specific functional requirements that will influence the software architecture implementation.*
 - o Technologies used - operating systems, databases, computer languages, frameworks, API's etc.*
 - o Implementation of the system - main body of work for the chapter. This will discuss precisely how the system was developed, based on the analysis and design considerations.*
 - o Problems encountered - any issues that may have arisen during the implementation phase, e.g. the project's cross-platform compatibility between different operating systems.*
-

4.1 Part 1: Software Architecture Implementation

Setting up Google Cloud Platform

My website will be on the cloud so I have chosen GCP (Google Cloud Platform)

Google Cloud Platform, offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube.

Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments.

Why we should transform a business with Google Cloud.

Modernize workloads on Google's global, secure, and reliable infrastructure.

Develop and run applications using open source and other software without operations staff.

Get insights from data with a full suite of analytics and ML tools.

- **Reduce risk with world-class security**

Your most challenging security scenarios are protected by the same secure-by-design infrastructure, global network, and built-in safeguards that Google uses.

- **Flexible hybrid and multi-cloud options**

Our managed, cloud-native solution means you can write an application once, then run it on-premises, on GCP, or on other clouds with no change in infrastructure

▪ **Power innovations with AI and ML**

Our easy-to-use artificial intelligence and machine learning capabilities are embedded in our core solutions, making them accessible and easily deployed.

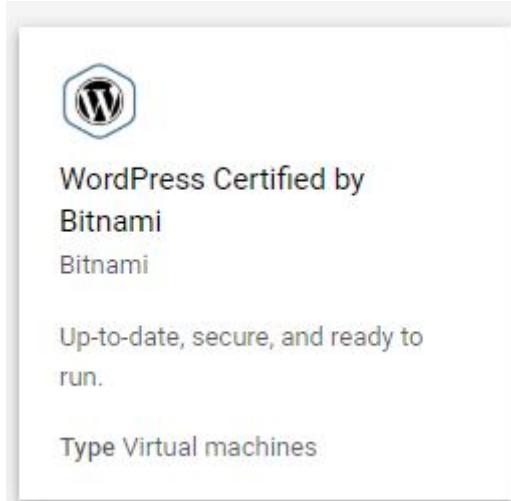
Step by step Setting up a WordPress site on Google Cloud.

Step 1:

I have created a project

Step 2:

Marketplace I have created a virtual machine



Step 3:

I have to give my WordPress site a name and set up a (0.6GB) micro instance in the Europe West Zone .

Small instance is cheaper.

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[←](#) New WordPress Certified by Bitnami deployment

Deployment name

Zone

Machine type 1.7 GB memory

Boot Disk

Boot disk type

Boot disk size in GB

Networking

Network

Subnetwork

External IP

Firewall

Add tags and firewall rules to allow specific network traffic from the Internet

Allow HTTP traffic

Source IP ranges for HTTP traffic

Allow HTTPS traffic

Source IP ranges for HTTPS traffic

 **WordPress Certified by Bitnami overview**
Solution provided by Bitnami

\$13.61 per month estimated
Effective hourly rate \$0.019 (730 hours per month)

[▼ Details](#)

Software

| Operating System | Debian (9) |
|------------------|--|
| Software | Apache (2.4.39)
ImageMagick (6.9.8)
lego (2.6.0)
MySQL (8.0.16)
OpenSSL (1.0.2s)
PHP (7.3.6)
phpMyAdmin (4.9.0.1)
SQLite (3.28.0)
Varnish (6.0.3)
WordPress (5.2.2)
WP-CLI (2.2.0) |

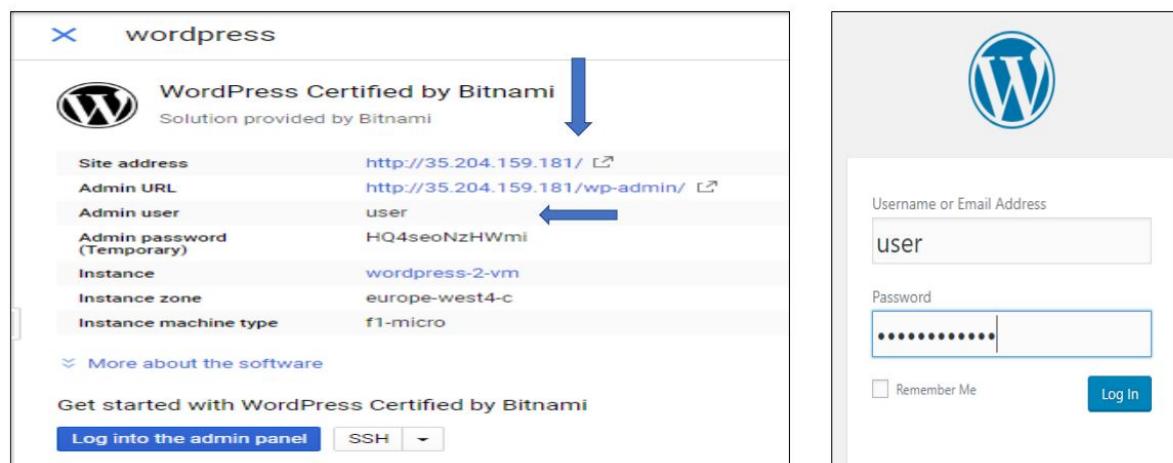
Documentation

- [Access using SSH](#) Configure SSH keys to access the application as the user "bitnami".
- [Using SFTP](#) Use this guide to upload files using SFTP.
- [MySQL access credentials](#) Use username "root" and the temporary password to access MySQL.
- [Change your MySQL root password](#) Change your temporary MySQL root password by following these instructions
- [Accessing phpMyAdmin](#) Access phpMyAdmin via an SSH tunnel using this guide.
- [Adding plugins with privileges](#) Some plugins need privileged access to install. Edit privileges with this guide.
- [Installation directory structure](#) Learn how application files, libraries and configuration files are organized.

[Terms of Service](#)

Step 4:

Once to site is complete I can log-in using the username and password given. Note This is the new site has an external IP address



wordpress

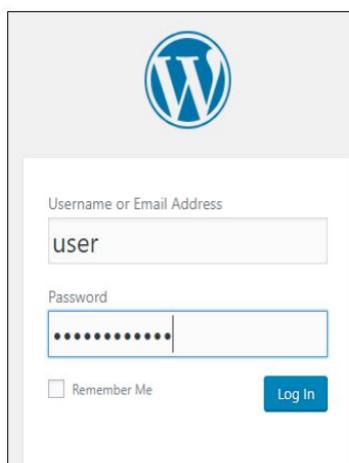
 **WordPress Certified by Bitnami**
Solution provided by Bitnami

| | |
|----------------------------|---|
| Site address | http://35.204.159.181/ |
| Admin URL | http://35.204.159.181/wp-admin/ |
| Admin user | user |
| Admin password (Temporary) | HQ4seoNzHWmi |
| Instance | wordpress-2-vm |
| Instance zone | europe-west4-c |
| Instance machine type | f1-micro |

[More about the software](#)

[Get started with WordPress Certified by Bitnami](#)

[Log into the admin panel](#)



Create easy website.

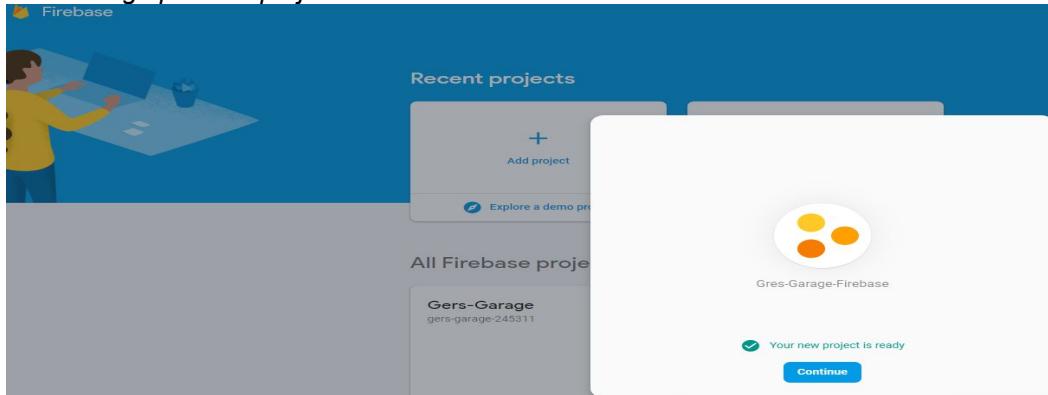
2. Firebase:

Firebase is a mobile and web application development platform developed by Firebase, Inc. in 2011, then acquired by Google in 2014.

ADD MORE INFO

I will use this platform to host my website.

This is the setting up a new project.



The project ready to use.

I am using the Virtual Studio Code software to develop my application. I have to install the firebase in the terminal.

npm install -g firebase-tools This is Node.js® is a JavaScript runtime built system.

Add Firebase to your web app

- 1 Register app

- 2 Add Firebase SDK

Copy and paste these scripts into the bottom of your <body> tag, but before you use any Firebase services:

```
<!-- The core Firebase JS SDK is always required and must be listed first -->
<script src="/__/firebase/6.3.0.firebaseio.js"></script>

<!-- TODO: Add SDKs for Firebase products that you want to use
      https://firebase.google.com/docs/web/setup#available-services -->

<!-- Initialize Firebase -->
<script src="/__/firebase/init.js"></script>
```



Learn more about Firebase for web: [Get Started](#), [Web SDK API Reference](#), [Samples](#)

This is the code has to copy to the html file.

I have created a new project folder on my computer. I have a login to the Firebase. Now The firebase created all of the necessary files I need to my website.

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After I have run the command All of the project files is ready to use.

Next step to run the app locally. I have used the command firebase serve

*After I have run the command I can check my website is running locally.
<http://localhost:5000>*

```
PS C:\Users\barcz\Documents\CCT_FinalProject\Ger-s_Garage\WebApp -> firebase serve  
==> Serving from 'C:\Users\barcz\Documents\CCT_FinalProject\Ger-s_Garage\WebApp -3'...  
+ hosting: Serving hosting files from: public  
+ hosting: Local server: http://localhost:5000
```

The screenshot shows a white page with a blue header bar at the top containing the Google logo and the word "FIREBASE". Below the header, the word "Welcome" is displayed in orange. The main content area has a light gray background. It features the heading "Firebase Hosting Setup Complete" in large, bold, black font. Below the heading is a message in a smaller, regular black font: "You're seeing this because you've successfully setup Firebase Hosting. Now it's time to go build something extraordinary!". At the bottom of the page is a large blue button with the text "OPEN HOSTING DOCUMENTATION" in white, all-caps font.

`firebase serve` `http://localhost:5000/`

`firebase deploy`

This command help to host the website in the cloud.

.36"

Shutting down...

Terminate batch job (Y/N)?

Terminate batch job (Y/N)? y

PS C:\Users\barcz\Documents\CCT_FinalProject\Ger-s_Garage\WebApp -3> `firebase deploy`

== Deploying to 'gres-garage-firebase'...

```
i  deploying hosting
i  hosting[gres-garage-firebase]: beginning deploy...
i  hosting[gres-garage-firebase]: found 1 files in public
+  hosting[gres-garage-firebase]: file upload complete
i  hosting[gres-garage-firebase]: finalizing version...
+  hosting[gres-garage-firebase]: version finalized
i  hosting[gres-garage-firebase]: releasing new version...
+  hosting[gres-garage-firebase]: release complete
```

+ Deploy complete!

Project Console: <https://console.firebaseio.google.com/project/gres-garage-firebase/overview>

Hosting URL: <https://gres-garage-firebase.firebaseio.com>

PS C:\Users\barcz\Documents\CCT_FinalProject\Ger-s_Garage\WebApp -3>

Hosting URL: <https://gres-garage-firebase.firebaseio.com>

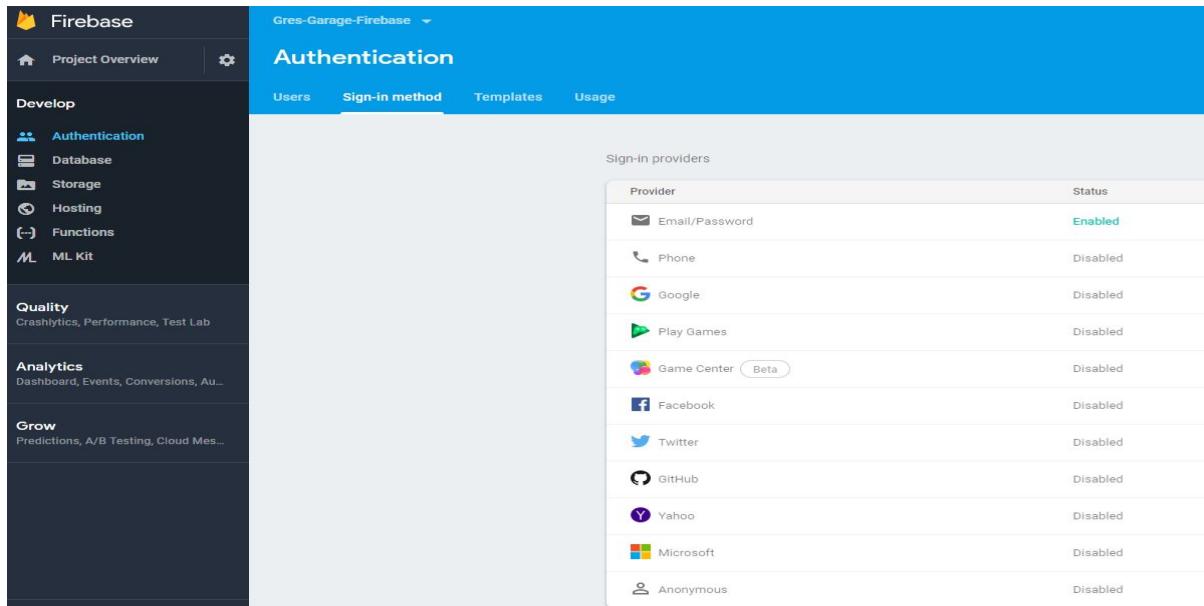
This is the URL where I can find the website.

4.2 Part 2: System Analysis and Design Reflections

11. This will discuss precisely how the system was developed, based on the analysis and design considerations.

1. Login:

I have chosen the firebase because It gives lots of different options to create a login method. The user can be authentication different way. It is easy to set up and implement this future to the program. I have chosen the email way because I can use the email to send the marketing message to the user. I can implement another way if I have more time.



The screenshot shows the Firebase console's Authentication section. On the left is a sidebar with 'Project Overview' and sections for 'Develop' (Authentication, Database, Storage, Hosting, Functions, ML Kit), 'Quality' (Crashlytics, Performance, Test Lab), and 'Analytics' (Dashboard, Events, Conversions, etc.). The main area is titled 'Authentication' and contains tabs for 'Users', 'Sign-in method', 'Templates', and 'Usage'. Below these tabs is a table titled 'Sign-in providers' with columns for 'Provider' and 'Status'. The table lists ten providers: Email/Password (Enabled), Phone (Disabled), Google (Disabled), Play Games (Disabled), Game Center (Beta, Disabled), Facebook (Disabled), Twitter (Disabled), GitHub (Disabled), Yahoo (Disabled), Microsoft (Disabled), and Anonymous (Disabled).

| Provider | Status |
|----------------|------------------|
| Email/Password | Enabled |
| Phone | Disabled |
| Google | Disabled |
| Play Games | Disabled |
| Game Center | Beta
Disabled |
| Facebook | Disabled |
| Twitter | Disabled |
| GitHub | Disabled |
| Yahoo | Disabled |
| Microsoft | Disabled |
| Anonymous | Disabled |

This screenshot is showing the other sign-in methods.

- Email/Password
- Phone
- Google
- Play Games
- Game Center Beta
- Facebook
- Twitter
- GitHub
- Yahoo
- Microsoft
- Anonymous

4.3 Part 3: Problems confronted

17. Problems encountered - any issues that may have arisen during the implementation phase, e.g. the project's cross-platform compatibility between different operating systems.

5 Testing and Evaluation:

Details of the learner's test plans, test results, user evaluations and discussion of these results in detail and in summary.

Possible entries in this chapter might include:

- Functional correctness
 - o Set of tasks system should be able to perform – part of requirements specification of system and include a focus on efficiency
 - o Set of inputs and correct outputs
 - o Set of 'test scripts'
- Objective of test / statement of which part of systems is being tested
- Input data/situation
- Correct output data / state / behaviour
- Need to show actual results of test – screen shots
- Evaluation - if actual matches correct then working
- Usability
 - o List of usability requirements
 - set of tasks user should be able to perform
 - Have a set of tasks for each type of user
 - System Response times
 - Time for user to complete a task
 - Aesthetic
 - Acceptable navigation of site and layout
- o Set of 'test scripts'
- Instructions for user
- Observation / measure time / evaluate success of task
- Analyse results to come up with usability result
 - o Can also measure qualitative usability aspects with questionnaires / structured interviews etc.
- Commercialisation / marketing
 - o Requirements – registration on web search engines, direct marketing – discuss real commercialisation aspects of project
 - o Evaluation – have set of key words / phrases for targeted websites

5.1 Part 1: Functional Requirements

1. Set of tasks system should be able to perform – part of requirements specification of system and include a focus on efficiency
 - o Set of inputs and correct outputs
 - o Set of 'test scripts'
 - Objective of test / statement of which part of systems is being tested
 - Input data/situation
 - Correct output data / state / behaviour
 - Need to show actual results of test – screen shots
 - Evaluation - if actual matches correct then working
 - Usability

5.2 Part 2: Instructions for user

11. CompuTech has two departments. Using Active Directory Users and Computers

(ADUC), **create 2 departments** (Organizational Units) called Accounting-Dublin and Sales-Dublin. Inside the **Accounting-Dublin** OU and in the **Sales-Dublin** OU create user accounts, and network groups as specified below:

12. Inside the **Accounting-Dublin** OU create a Global Security group called **Accounting** and then create the 5 **Accounting** users accounts shown below, using the names supplied.

5.3 Part 3: Commercialisation / Marketing

17. Requirements – registration on web search engines, direct marketing –discuss real commercialisation aspects of project Evaluation – have set of key words / phrases for targeted websites

6 Conclusions:

The Individual needs to review the entire project against their problem context, aims and objectives, and evaluate project success and results. This may also include a section for suggestions for further work.

Appendix A: Code Listings

This should be a link to a cloud resource (such as GitHub) where the project code is maintained. Students should have only included selected code fragments or algorithm summaries in the main chapters, otherwise the project report can become a monotonous technical manual rather than a story of what they did and why they did it.

6.1 Part 1: Evaluate the success and results of the project

1. Using virtualization software, **install** 2 virtual machines.

Use Server 2012 R2 (GUI).) or Server 2008R2 (GUI) (Both Server OS not Client OS)

One VM will act as the Server and the other VM will act as the Client. [Client will also be Web Server]

6.2 Part 2: Suggestions for further work

11. CompuTech has two departments. Using Active Directory Users and Computers

(ADUC), create 2 departments (Organizational Units) called Accounting-Dublin and Sales-Dublin. Inside the **Accounting-Dublin** OU and in the **Sales-Dublin** OU create user accounts, and network groups as specified below:

12. Inside the **Accounting-Dublin** OU create a Global Security group called **Accounting** and then create the 5 **Accounting** users accounts shown below, using the names supplied.

7 Code Listings:

This should be a link to a cloud resource (such as GitHub) where the project code is maintained. Students should have only included selected code fragments or algorithm summaries in the main chapters, otherwise the project report can become a monotonous technical manual rather than a story of what they did and why they did it.

7.1 Part 1: #####

7.2 Part 2: #####

11. CompuTech has two departments. Using Active Directory Users and Computers

7.3 Part 3: #####

8 Appendix B: (other technical or data appendices as required):

If you have additional technical data to showcase it should be included in this appendix, you can also use this appendix to present the raw data of empirical research carried out (questionnaires, interviews etc.)

8.1 Part 1: : Project Planning

1. U

8.2 Part 2: Reflective Learning Journal

11. C

9 List of References:

All citations used within the report should include their full reference using the Harvard referencing style. A reference list should be included in this section of the report.

17. U