Introduction:

The current generation of computers faces innumerable experiments that obstruct their competencies and good organization. These encounters stand up outstanding to the accumulative difficulties of composite calculations, the requirement for superior remembrance measurements, safekeeping defenselessness, and questions correlated to energy ingestion and warmness intemperance.

Four (4) challenges with current generation of computers;

i. **Processing power limitations:**

One of the most important encounters with the present-day age bracket of computers is the restriction in giving out power. This inadequacy becomes obvious when big business with tasks that require wide-ranging of computational power. For example, weather modeling, which involves pretending complex atmospheric environments, demands high computational competencies. Nevertheless, old-fashioned computers struggle to provide well-organized explanations for such tasks according Smith, W. L. (2019).The processing power restrictions of present-day computers can also disturb other applications, such as medication discovery and machine learning, where hurried and perfect computations are essential for operational results (LeCun, Y., Bengio, Y., & Hinton, G. 2015)

ii. **Memory limitations:**

Additional encounter that up-to-date computers surface is the inadequacy in memory measurements and right of entry speed. The intensification of data-intensive presentations and the prerequisite to handgrip large datasets have made greater memorial dimensions crucial. On the other hand, the current recollection equipment, like Random Access Memory (RAM) and hard drives, have practical boundaries in terms of storage compactness, speediness, and cost-effectiveness. For instance, when functioning with big data analytics, gain access to a superior amount of data from memory takes extended time, which influences complete dispensation period stated (Nagle, R., & Cates, T. 2016). This inadequacy turn into predominantly thought-provoking when dealing with real-time data investigation or management of enormous databases.

iii. Security vulnerabilities:

With the improvement of technology, the complication of computer-generated terrorizations has enlarged, posing a insignificant experiment for existing computers. These computers surface abundant security vulnerabilities, and guaranteeing that data security has turn out to be more thought-provoking. The interconnectedness of devices and the accumulative dependence on software applications make it problematic to safeguard against malicious attacks and malware. Vulnerabilities in operational classifications and software applications can lead to data openings and compromise user privacy (Choi, Y., & Choi, J. H. 2020). For example, ransomware attacks have become a momentous cybersecurity issue, causing financial sufferers and heart-rending a number of organizations and individuals.

vi. Energy consumption and heat dissipation:

Modern-day computers put away a noteworthy amount of power and generate a substantial amount of heat, which principals to increased energy costs and the need for better refrigeration systems. The boundaries of present-day computer architectures in terms of liveliness effectiveness and heat overindulgence pose encounters for manipulative dependable and supportable computer systems. Data centers, which household thousands of servers, surface momentous encounters in management and refrigerating the systems, occasioning in extraordinary energy ingestion (Masanet, E. 2017). Moreover, transferrable devices, such as smartphones and laptops, often skirmish to sense of balance performance and battery-operated life expectancy due to energy depletion apprehensions.

The contemporary generation of computers surfaces numerous encounters that influence their processing power, memory capacity, safekeeping, and get-up-and-go consumption. These experiments hold back the well-organized operational of computers in innumerable domains, from weather modeling and drug discovery to data analysis and cybersecurity. It is indispensable to give a lecture to these contests to empower the development of additional controlling, secure, and energy-efficient computing systems. Forthcoming improvements in computer hardware and software technologies are fundamental to overcome these experiments and get to the bottom of the full potential of computing in a number of sectors.

Quantum Computing

Quantum computing is a revolutionary methodology to computation that harnesses the philosophies of quantum mechanics for development of information. Unlike established computers, which use bits to represent data as 0s and 1s, quantum computers use quantum bits or qubits. Qubits can exist in numerous circumstances at the same time due to a possessions called superposition, which countenances for corresponding computations. Quantum superposition and embarrassment enable quantum computers to perform certain computations exponentially faster than classical computers.

Three technological developments possible in Quantum Computing as compared to the current generation of computers;

i. Increased processing power:

Quantum computers have the impending to disentangle convinced complications meaningfully more rapidly than classical computers. For example, Shor's algorithm, a quantum algorithm for factoring enormous quantities, could breakdown up-to-date cryptography methods and revolutionize secure communication, according to Shor, P. W. (1997). Quantum computers can also elucidate multifaceted optimization teething troubles more professionally, leading to advances in areas such as logistics and supply chain management (Farhi, E., Goldstone, J., & Gutmann, S. 2014). This increased dispensation power of quantum computers has the prospective to revolutionize numerous grounds in necessitating concentrated computational tasks.

ii. Quantum parallelism and superposition:

Quantum computers can be able to accomplish compound calculations simultaneously, thanks to quantum parallelism and superposition. This competency tolerates for a considerable acceleration of computational responsibilities. For instance, quantum machine learning algorithms can make development and investigate enormous datasets in parallel, leading to more rapidly and more precise investigation and predictions , Lloyd, S., Mohseni, M., & Rebentrost, P. (2013). Quantum parallelism can also improve simulations and modeling in areas such as quantifiable science and quantum chemistry. Instead of chronologically appraising each opportunity like classical

computers, quantum computers can explore all possibilities simultaneously, suggestively dropping the computational time.

iii. Quantum cryptography:

Quantum computing offers advancements in terms of security. Quantum cryptography adventures the belongings of quantum technicalities to empower safe as houses communication frequencies. Quantum key distribution (QKD) is an example of quantum cryptography that countenances for the construction of indestructible encryption keys using quantum entanglement, stated by Ekert, A. K. (1991). Unlike classical cryptographic approaches that depend on on mathematical complexity, quantum cryptography make available a secure means of transmitting confidential information. Quantum communication protocols are expected to provide enhanced security in areas such as financial transactions and data privacy, especially in a world threatened by quantum computing outbreaks.

Quantum Computing is a revolutionary methodology that make use of the principles of quantum mechanics to accomplish computations exponentially more rapidly than classical computers. With the prospective to disentangle composite teething troubles, adventure quantum parallelism and superposition, and enhance security through quantum cryptography, quantum computing embraces pronounced possibilities for a comprehensive collection of applications. However, it is important to footnote that quantum computing is still an emerging field, and there are significant technical and practical experiments to overcome in advance the complete impending of quantum computers can be understood.

Conclusion

In conclusion, the current generation of computers faces enormous challenges in processing power, energy consumption, data storage and security. However, the beginning of quantum computing brings awakening opportunities. Quantum computers presents strengthened computational power, prospective improvements in cryptography, and enhanced optimization and machine knowledge procedures. These advancements have the impending to transform numerous businesses and work out obstacles that are presently ahead of the abilities of classical computers.

References:

Choi, Y., & Choi, J. H. (2020). Analysis of cyber-attack patterns: A deep learning approach. Expert Systems with Applications, 154, 113373.

Ekert, A. K. (1991). Quantum cryptography based on Bell's theorem. Physical Review Letters, 67(6), 661-663. References:

Farhi, E., Goldstone, J., & Gutmann, S. (2014). A quantum approximate optimization algorithm. arXiv preprint arXiv:1411.4028.

LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. Nature, 521(7553), 436-444.
Lloyd, S., Mohseni, M., & Rebentrost, P. (2013). Quantum algorithms for supervised and unsupervised machine learning. arXiv preprint arXiv:1307.0411.

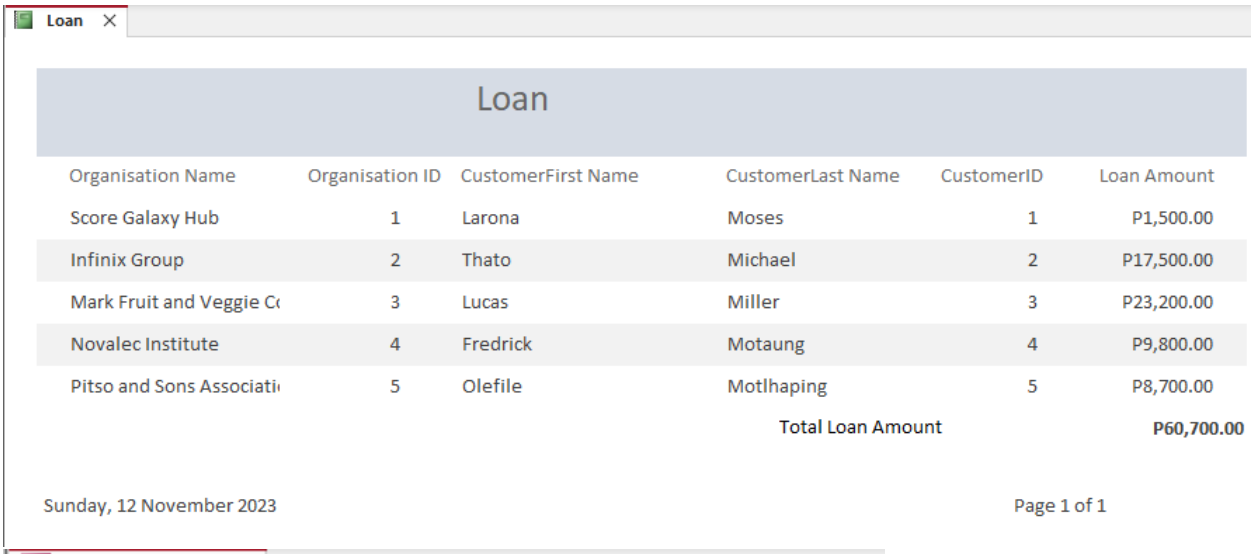
Nagle, R., & Cates, T. (2016). Big data's impact on the future of data analytics. Journal of Business Forecasting, 35(2), 9-12.

Shor, P. W. (1997). Polynomial-time algorithms for prime factorization and discrete logarithms on a quantum computer. SIAM Journal on Computing, 26(5), 1484-1509.

Smith, W. L. (2019). Weather modeling and forecasting in the age of machine learning. Journal of the Atmospheric Sciences, 76(2), 363-375.

Masanet, E. (2017). Global energy and material flows in data storage and communications networks. Environmental science & technology, 51(2), 394-405.

Task1

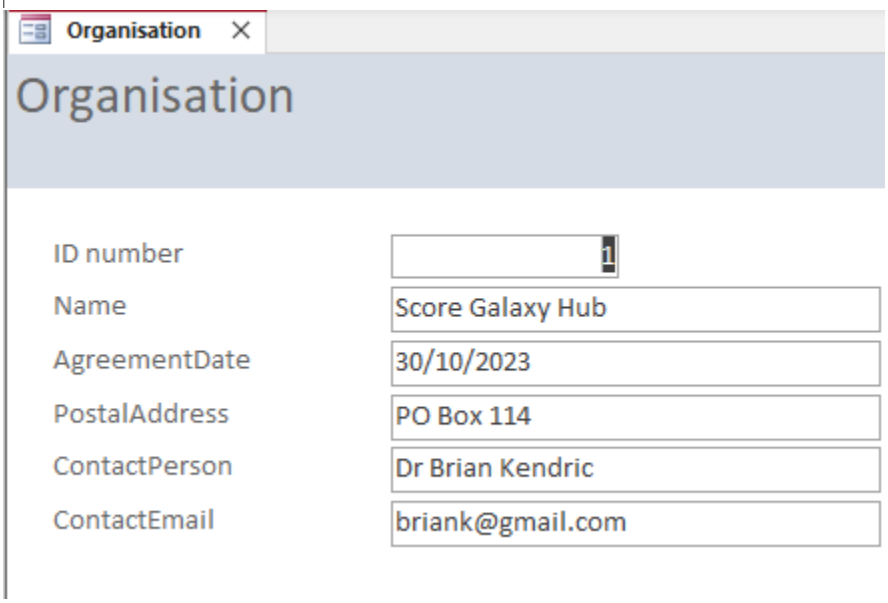


Loan

Loan

Organisation Name	Organisation ID	CustomerFirst Name	CustomerLast Name	CustomerID	Loan Amount
Score Galaxy Hub	1	Larona	Moses	1	P1,500.00
Infinix Group	2	Thato	Michael	2	P17,500.00
Mark Fruit and Veggie C(	3	Lucas	Miller	3	P23,200.00
Novalec Institute	4	Fredrick	Motaung	4	P9,800.00
Pitso and Sons Associati	5	Olefile	Motlhaping	5	P8,700.00
			Total Loan Amount		**P60,700.00**

Sunday, 12 November 2023 Page 1 of 1



Organisation

Organisation

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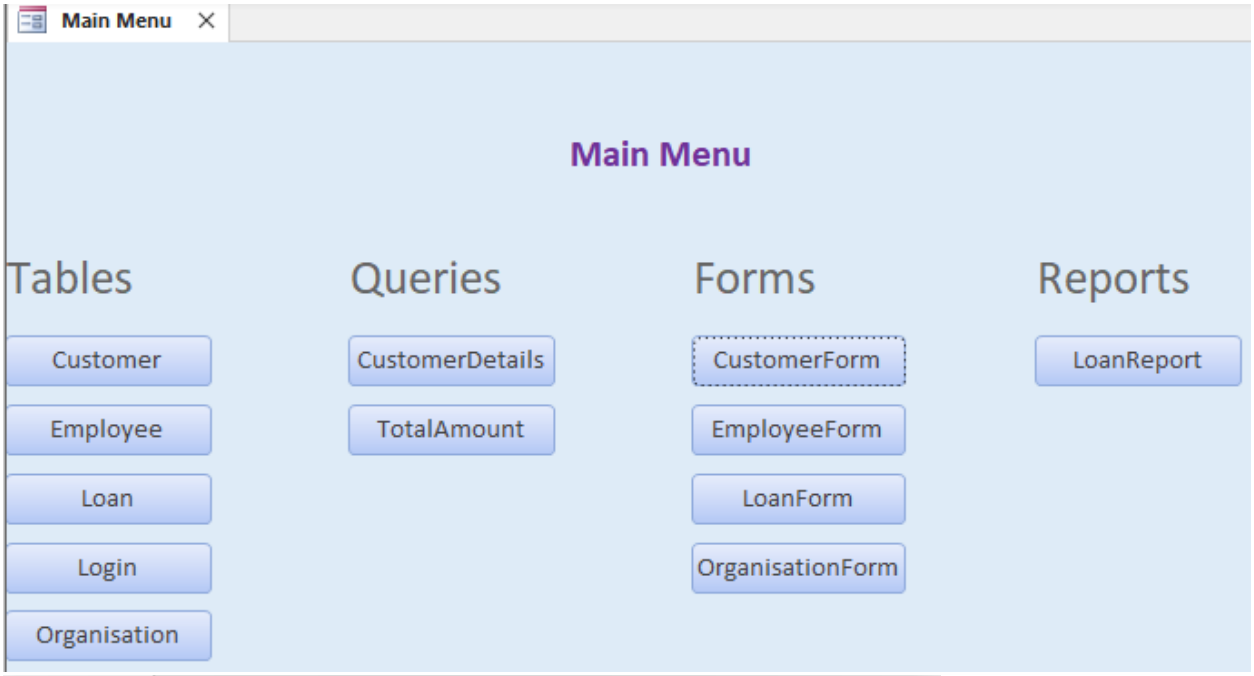
ContactPerson	Dr Brian Kendric
ContactEmail	briank@gmail.com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Forms
Reports
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Employee
Loan
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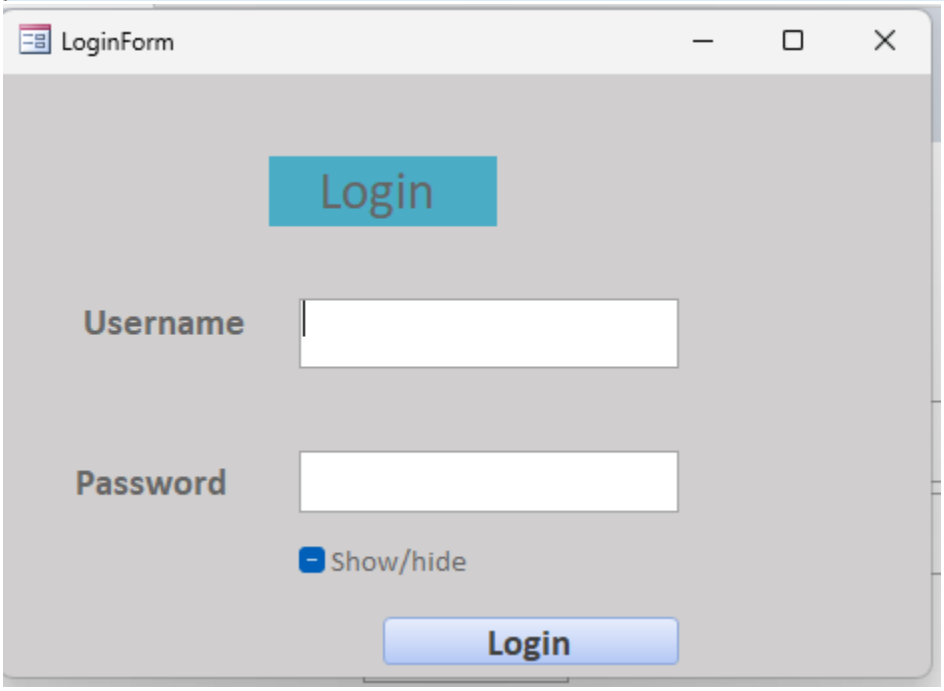
Organisation
CustomerDetails
TotalAmount
CustomerForm
EmployeeForm
LoanForm
OrganisationForm
LoanReport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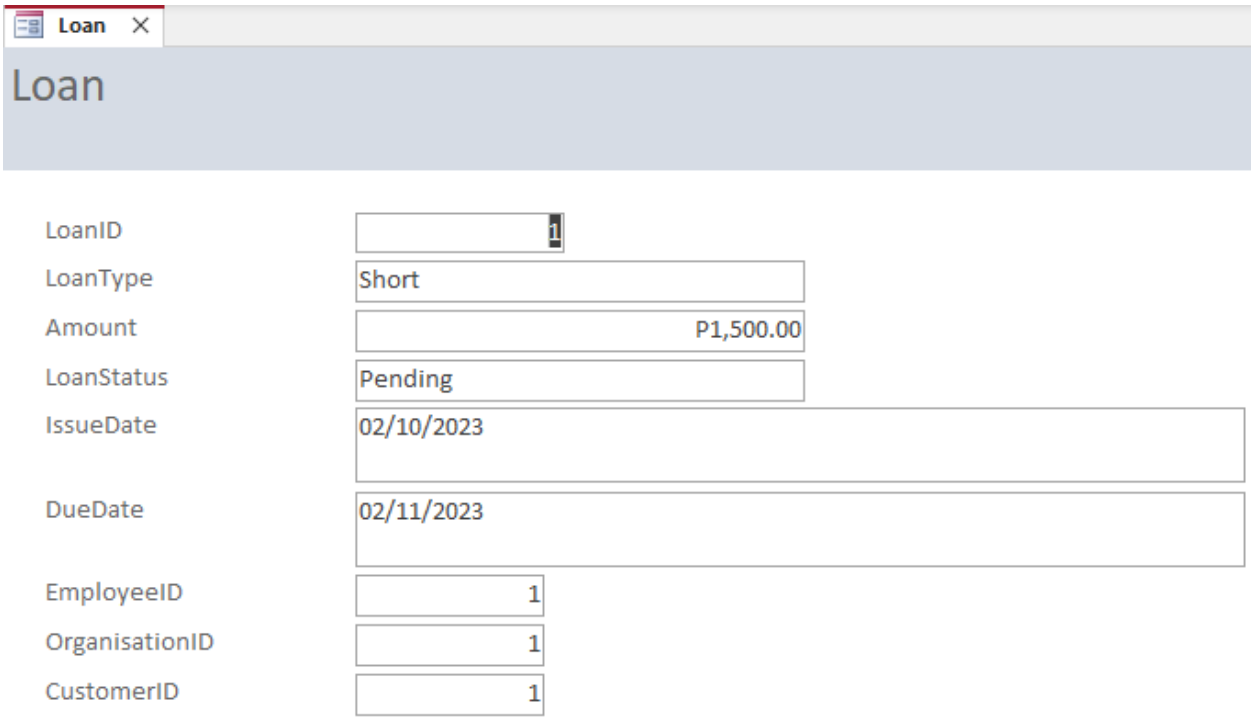
Password
Show/hide
Login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02/11/2023
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OrganisationID
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CustomerID
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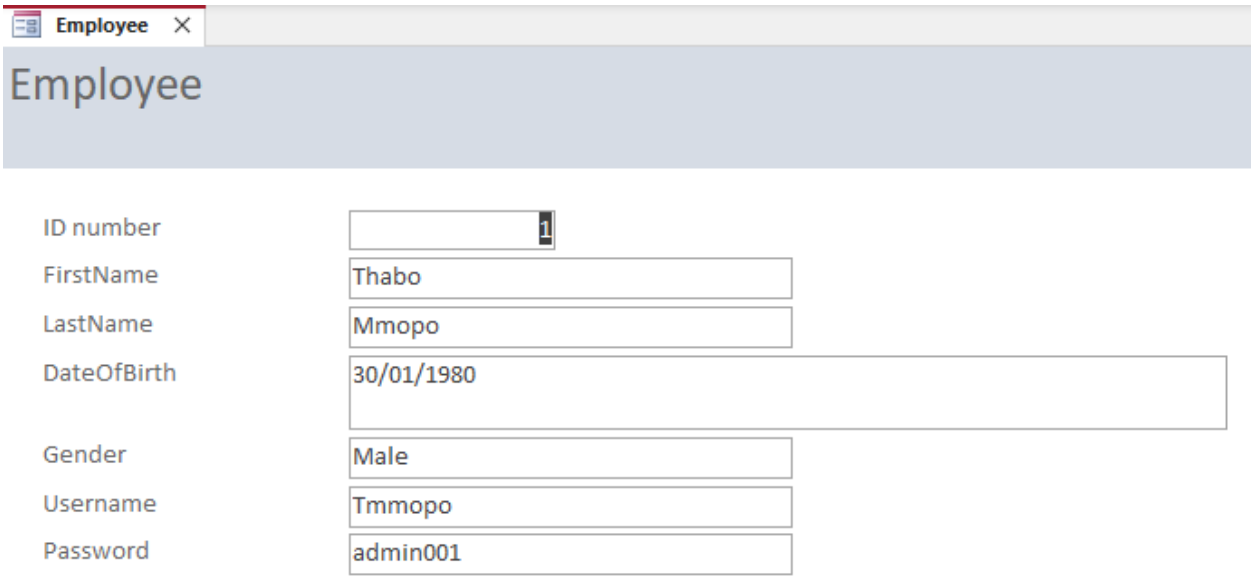
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Gender
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Username
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Password
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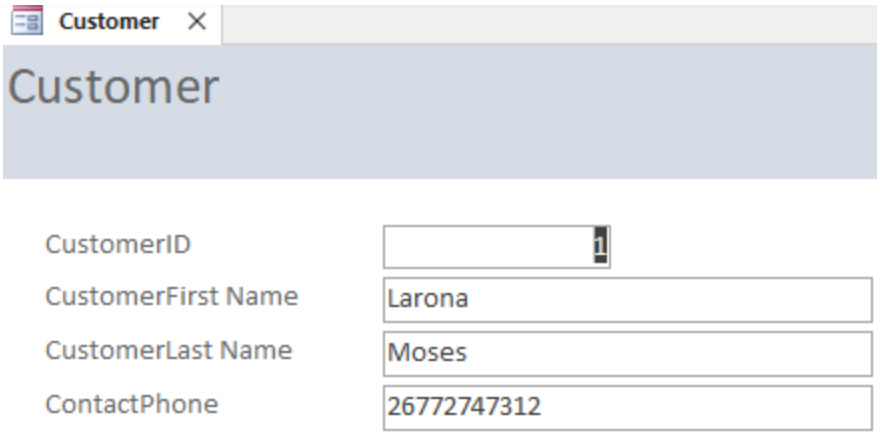
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CustomerID
1
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Larona
CustomerLast Name
Moses
ContactPhone
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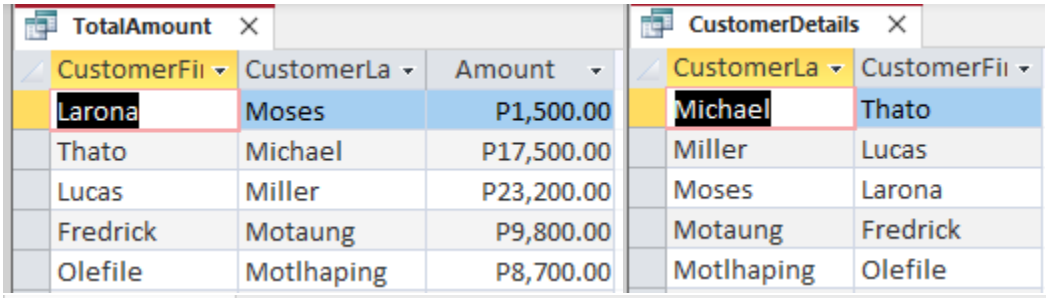
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Lucas
Miller
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Fredrick
Motaung
P9,800.00
Olefile
Motlhaping
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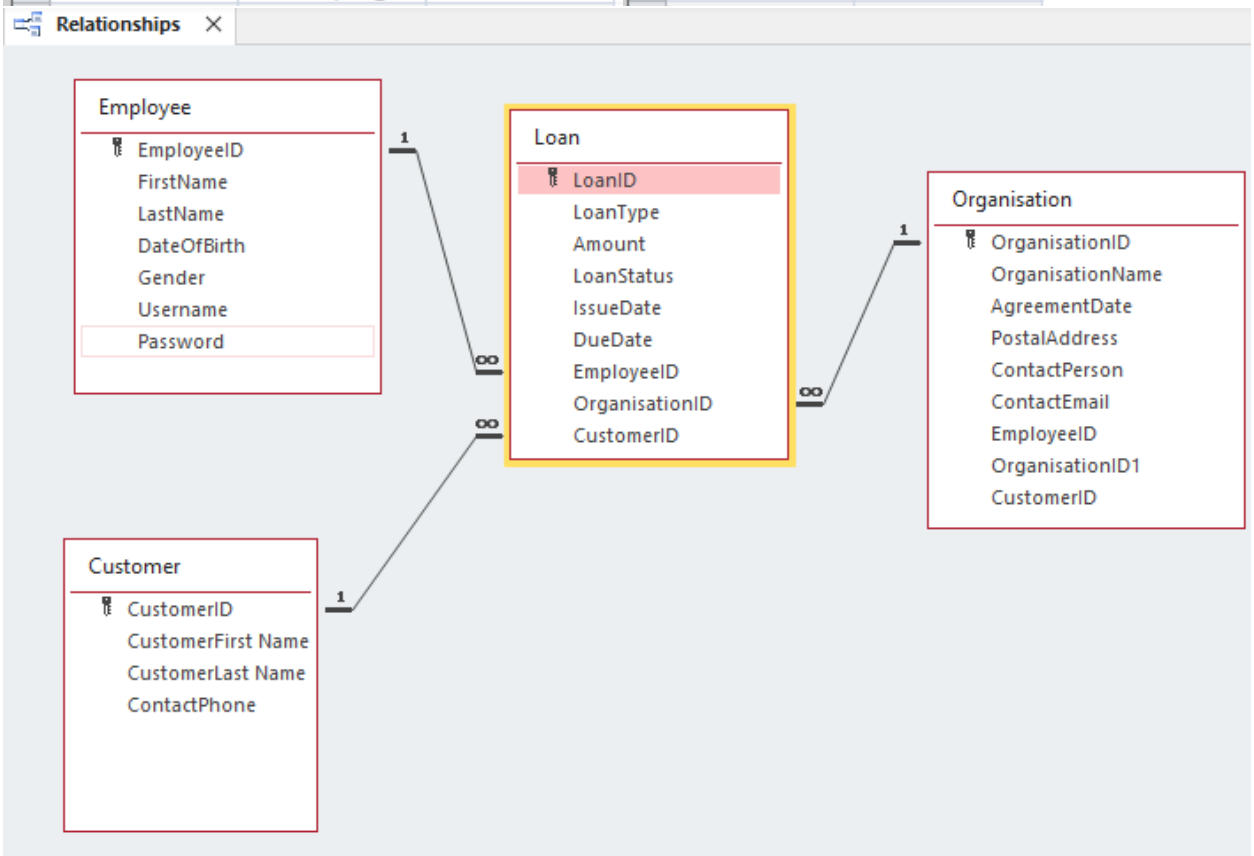
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Gender
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Password
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LoanType
Amount
LoanStatus
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OrganisationName
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PostalAddress
ContactPerson
ContactEmail
EmployeeID
OrganisationID1
CustomerID
Customer
CustomerID
CustomerFirst Name
CustomerLast Name
ContactPhone
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1
∞
1
∞

Organisation

ID number	Name	AgreementI	PostalAddre	ContactPers	ContactEma	EmployeeID	Organisatio	CustomerID
1	Score Galaxy H	30/10/2023	PO Box 114	Dr Brian Kendr	briank@gmail.	2	2	2
2	Infinix Group	15/10/2023	Private Bag 00(	Caiphus Malen	malemacaip@	3	3	3
3	Mark Fruit and	22/11/2023	Private Bag 02!	Paballo Mark	markp@gmail.	4	4	4
4	Novalec Institu	19/10/2023	P O Box 14100	Willam Foster	wfoster@gmai	5	5	5
5	Pitso and Sons	07/11/2023	Private Bag 51-	Christean Amb	christamber@			

Login

Username	Password
EdTsebe	admin003
MavukaKathy	admin005
NattyM	admin002
TladiL	admin004
Tmmopo	admin001

Loan

LoanID	LoanType	Amount	LoanStatus	IssueDate	DueDate	EmployeeID	Organisatio	CustomerID
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2	Long	P17,500.00	Approved	15/10/2023	15/11/2023	2	2	2
3	Long	P23,200.00	Approved	17/10/2023	17/11/2023	3	3	3
4	Short	P9,800.00	Pending	09/10/2023	09/11/2023	4	4	4
5	Short	P8,700.00	Pending	11/10/2023	11/11/2023	5	5	5

Employee

ID number	FirstName	LastName	DateOfBirth	Gender	Username	Password
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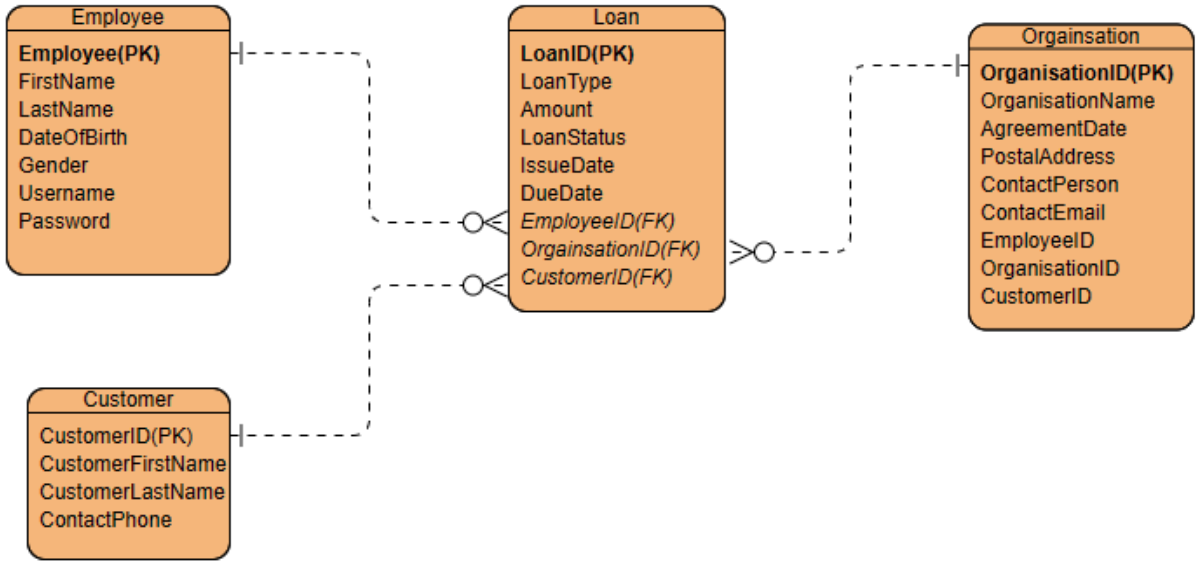
2	Natasha	Modibeng	15/12/1990	Female	NattyM	admin002
3	Edwin	Rraditsebe	20/05/1987	Male	EdTsebe	admin003
4	Lethabo	Tladi	1/06/2003	Male	TladiL	admin004
5	Katherine	Mavuka	18/10/2001	Female	MavukaKathy	admin005

Customer

CustomerID	CustomerFi	CustomerLa	ContactPho	Click to Add
1	Larona	Moses	26772747312	
2	Thato	Michael	26775418827	
3	Lucas	Miller	26774598123	
4	Fredrick	Motaung	26771458984	
5	Olefile	Motlhaping	26779761452	
(New)				



Task2

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11
MON	TUE	WED	THU	FRI	SAT	SUN	Total	lowest rainf	highest rainf	mean
10	5	30	20	15	0	50	130	0	50	18.57142857

TABLE 2

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column	Column	Column	Column
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total	lowest rai	highest ra	mean
30	25	55	100	60	40	35	60	35	25	20	10	495	10	100	41.25

a) Using the most appropriate formulas and funtions,
i) Calculate the total rainfall for the week and the year respectively.
Total rainfall for the week=130
Total rainfal for the year=495
ii) Find the lowest rainfall for the week and the year respectively.
lowest rainfall for the week =0
lowest rainfall for the year=10
iii)Find the highest rainfall for the week and year respectively.
highest rainfall for the week=50
highest rainfall for the year=100
iv)Find the mean rainfall for the week and year respectively

mean rainfall for the week=18.57142857
mean rainfall for the year=41.25