Unit 6 Assignment essay outline for Unit 9 essay

I. INTRODUCTION

A. Background
1. Queens medical centre acquiring ASMIS.
2. Install a web-based system for appointment and scheduling system with concerns of cybercrime and patient data protection.
3. More specific background information to lead into the thesis (reference)

B. Scope
1. Identifying areas of Networks, Software and Human Factors.
2. UML diagrams
3. Threat modelling technique to identify and mitigate potential cyber threats.
4. Use of cyber technologies to address the problem.

II. BODY

C. The benefits of ASMIS
1. Networks:
   WAN- Link to health authorities/boards across the country. Ease of access.
   LAN – Operational security can maintain CIA. Make disruption difficult. Attackers can only target parts of the system that are reachable.
   Client/server model for interprocess communication. Printing records (Brookshear et al., 2020)
2. Software:
   Patient records can be anonymized for research use through encryption. (Anderson, 2008)
   Web-based technologies can support patient data and drug directories being accessible from home. (Anderson, 2008)
   Ease of application use, medical staff, can focus more on their specialisms, and the quality of care is not affected. The software improves performance. (AlHajeri et al., 2021)
3. Human Factors:
   Access control: Patient records can be secured by only the Staff that need access.
   GDPR -conforms system to laws. Data confidentiality is established with access control.
   Efficiency and ease of manual work of all users.
   Reports can be shared easily with patients and privileged users who require access (linked departments, health authorities) (Sharma, 2021)
   The system will permit patients to access the doctor availability at their end, receive cancellation notification, request a prescription, request medical certification, and enable doctor visit fees payment on the system. This will solve the issues of phone booking, walk-ins bookings and long waiting queues. (Bankole, 2019)
   Attendance can improve if booked online (Parmar et al., 2009)

D. The problems of ASMIS and potential cyber threats.
1. Networks:
   WAN- concerns if breached.
   LAN- Segmentation or firewalls.

Network failure can cause grave consequences. DoS attacks can stop urgent treatment. (Anderson, 2008)
Threat actor using social engineering. Man in the middle attacks. (Anderson, 2008)
Brute force admin login and password.
Client/server model and printing vulnerabilities.

2. Software:
   Encryption methods can be breached, and medical research can become costly. (Anderson, 2008)
   Web-based technologies have assurance concerns of whether drug directories are exactly published by health authorities and whether doctors have suitable authentication methods and encryption tools to view data from home.
   Access control: Moving from Hardware to OS to Middleware to Application controls become more complex and less reliable. (Anderson, 2008)
   SQL Insertion/Injection Attacks
3. Human Factors:
   Patient records can be challenging to secure as doctors/nurses can move roles or departments. Personnel can have access for safety, privacy or both. (Anderson, 2008)
   Usability issues
   Malicious Staff deleting data
   Threat actor using social engineering.
   Staff need to enter data correctly.

E. UML diagrams and the threat modelling technique

1. Diagram 1 Use Case Diagram (Ambler, 2005)
   (See draft diagram below in Appendix 1.1)
   Aspects of the system
   Threat actor using brute force to obtain admin access to the system.
   Malicious Staff deleting sensitive and confidential data.
2. Diagram 2 Class Diagram (Ambler, 2005)
   (See draft diagram below in Appendix 1.2)
   Aspects of the system
3. Diagram 3 Sequence Diagram (Ambler, 2005)
   (See draft diagram below in Appendix 1.3)
   Aspects of the system
   Database- the user details must be protected. Malicious users must be controlled and can access.
   Actor – Login Portal - Database
4. Threat model: STRIDE (Howard et al., 2014)
   Analysis of STRIDE model to the threat.

F. Evaluation of the solutions

1. Passwords – education and CAPTCHA (Anderson, 2008)
2. Social Engineering – Phishing – password manglers, client certificate, education, soft keyboards, two-factor authentication, trusted computing, two-channel authentication. Concerns- Man in the middle attacks (Anderson, 2008)
3. An explicit security policy concerning access control.
   Domain, subdomains, user groups (doctors, nurses, personnel), device IP address level.

4. Architecture which is clean, and programs only have as much privilege as needed.
5. Segmentation
6. Firewalls – Packet filtering, circuit-level gateway, stateful inspection
7. Make compromise detection easier: Advanced logging, monitoring of activity and intrusion detection system.

III. CONCLUSION

G. Threat assessment
H. Confidentiality – right people with access
Integrity- Contingency, accuracy, trustworthiness (considering accountability, authenticity and reliability)
Availability- Reliability and uninterrupted access
Design approaches need to consider network, software and human factors to standards, guidelines and procedure policy.

IV. REFERENCES

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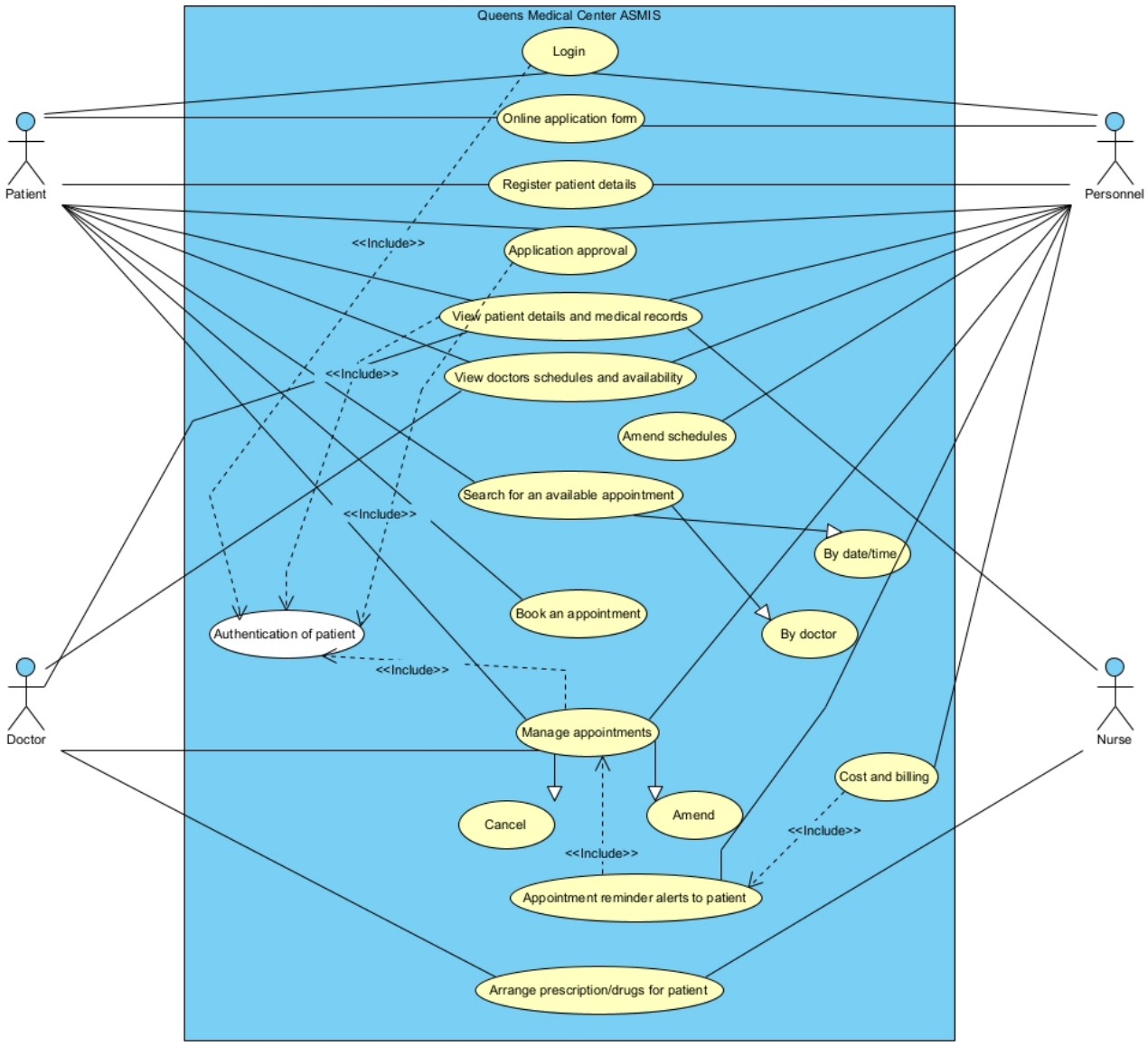
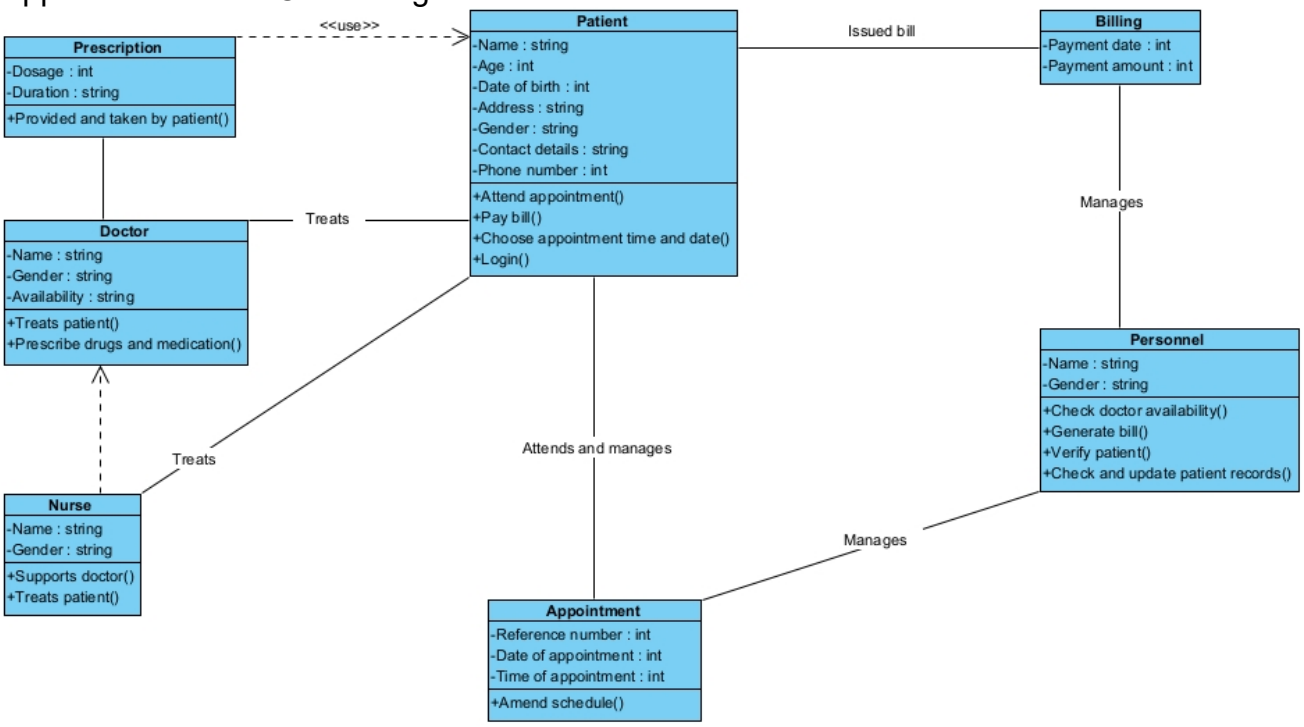
V. APPENDICES

(On the following pages)

Appendix 1.1 Draft Use Case Diagram



Appendix 1.2 Draft Class Diagram



Appendix 1.3 Draft Sequence Diagram