

Cry – Project 2

(Software Requirements Specification): Report

Daniel Dunning, Michael Degraw, Vu Phan

2017-02-13

Contents

1	Introduction	1
1.1	Purpose	1
1.2	Scope	2
1.3	Definitions, acronyms, and abbreviations	2
1.4	References	2
1.5	Overview	2
2	Overall description	2
2.1	Product perspective	2
2.2	Product functions	2
2.3	User characteristics	2
2.4	Constraints	2
2.5	Assumptions and dependencies	2
3	Specific requirements	2
3.1	External interface requirements	3
3.1.1	User interfaces	3
3.1.2	Hardware interfaces	3
3.1.3	Software interfaces	3
3.1.4	Communications interfaces	3
3.2	Classes	3
3.2.1	cryptosystem/	3
3.2.2	party/	4
3.2.3	cryptoframework.h	6
3.3	Performance requirements	7
3.4	Design constraints	7
3.5	Software system attributes	7
3.6	Other requirements	7

1 Introduction

Michael Degraw

1.1 Purpose

Please write here.

1.2 Scope

Please write here.

1.3 Definitions, acronyms, and abbreviations

Please write here.

1.4 References

Please write here.

1.5 Overview

Please write here.

2 Overall description

Daniel Dunning

2.1 Product perspective

Please write here.

2.2 Product functions

Please write here.

2.3 User characteristics

Please write here.

2.4 Constraints

Please write here.

2.5 Assumptions and dependencies

Please write here.

3 Specific requirements

Vu Phan

3.1 External interface requirements

3.1.1 User interfaces

3.1.2 Hardware interfaces

3.1.3 Software interfaces

3.1.4 Communications interfaces

3.2 Classes

3.2.1 cryptosystem/

cryptosystem.h

```
#ifndef CRYPTOSYSTEM_CRYPTOSYSTEM_H
#define CRYPTOSYSTEM_CRYPTOSYSTEM_H

////////////////////////////////////

enum EnumeratedCryptosystem {rsa}; // more to come

////////////////////////////////////

using IntPtr = mpz_t; // GNU Multiple Precision Integer Type
using Key = IntPtr;
using Text = IntPtr;

////////////////////////////////////

class Cryptosystem {
public:
    virtual void generateKeys(Key publicKey, Key privateKey); // set these

    virtual void encrypt(Text ciphertext, // set this
        const Text plaintext, const Key publicKey);

    virtual void decrypt(Text plaintext, // set this
        const Text ciphertext, const Key privateKey);

    virtual void cryptanalyze(Text plaintext, // set this
        const Text ciphertext, const Key publicKey);
};

////////////////////////////////////

#endif // CRYPTOSYSTEM_CRYPTOSYSTEM_H
```

rsa.h

```

#ifndef CRYPTOSYSTEM_RSA_H
#define CRYPTOSYSTEM_RSA_H

////////////////////////////////////

#include "cryptosystem.h"

////////////////////////////////////

class Rsa : public Cryptosystem {
public:
    void generateKeys(Key publicKey, Key privateKey); // set these

    void encrypt(Text ciphertext, // set this
        const Text plaintext, const Key publicKey);

    void decrypt(Text plaintext, // set this
        const Text ciphertext, const Key privateKey);

    void cryptanalyze(Text plaintext, // set this
        const Text ciphertext, const Key publicKey);
};

////////////////////////////////////

#endif // CRYPTOSYSTEM_RSA_H

```

3.2.2 party/

party.h

```

#ifndef PARTY_PARTY_H
#define PARTY_PARTY_H

////////////////////////////////////

#include "../cryptosystem/cryptosystem.h"

////////////////////////////////////

class Party {
public:
    Cryptosystem cryptosystem;

    Party(EnumeratedCryptosystem enumeratedCryptosystem);
};

```

```
////////////////////////////////////  
#endif // PARTY_PARTY_H
```

sender.h

```
#ifndef PARTY_SENDER  
#define PARTY_SENDER  
  
////////////////////////////////////  
#include "party.h"  
  
////////////////////////////////////  
  
class Sender : public Party {  
public:  
    Text ciphertext;  
  
private:  
    Text plaintext;  
  
    void encrypt(const Key publicKey);  
    // { cryptosystem.encrypt(ciphertext, plaintext, publicKey)}  
};  
  
////////////////////////////////////  
#endif // PARTY_SENDER
```

receiver.h

```
#ifndef PARTY_RECEIVER  
#define PARTY_RECEIVER  
  
////////////////////////////////////  
#include "party.h"  
  
////////////////////////////////////  
  
class Receiver : public Party {  
public:  
    Key publicKey;  
  
private:  
    Key privateKey;  
    Text plaintext;
```

```

    void generateKeys();
        // { cryptosystem.generateKeys(publicKey, privateKey)}

    void decrypt(const Text ciphertext);
        // { cryptosystem.decrypt(plaintext, ciphertext, privateKey)}
};

////////////////////////////////////

#endif // PARTY_RECEIVER

```

eavesdropper.h

```

#ifndef PARTY_EAVESDROPPER
#define PARTY_EAVESDROPPER

////////////////////////////////////

#include "party.h"

////////////////////////////////////

class Eavesdropper : public Party {
private:
    Text plaintext;

    void cryptanalyze(const Text ciphertext, const Key publicKey);
        // { cryptosystem.cryptanalyze(plaintext, ciphertext, publicKey)}
};

////////////////////////////////////

#endif // PARTY_EAVESDROPPER

```

3.2.3 cryptoframework.h

```

#ifndef CRYPTOFRAMEWORK_H
#define CRYPTOFRAMEWORK_H

////////////////////////////////////

#include "party/sender.h"
#include "party/receiver.h"
#include "party/eavesdropper.h"

////////////////////////////////////

```

```

class Cryptoframework {
public:
    Sender sender;
    Receiver receiver;
    Eavesdropper eavesdropper;

    Cryptoframework(EnumeratedCryptosystem enumeratedCryptosystem);

    void testKeyGeneration();
        // { receiver.generateKeys() }

    void testEncryption();
        // { sender.encrypt(receiver.publicKey) }

    void testDecryption();
        // { receiver.decrypt(sender.ciphertext) }

    void testCryptanalysis();
        // { eavesdropper.cryptanalyze(sender.ciphertext, receiver.publicKey) }
};

////////////////////////////////////

#endif // CRYPTOFRAMEWORK_H

```

3.3 Performance requirements

3.4 Design constraints

3.5 Software system attributes

3.6 Other requirements