Software Requirements Specification

Project: 校园超速监控系统（更改）

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# Introduction

## Purpose

Delineate the purpose of the software to be specified.

【示例】本软件系统的主要目的是监控校园内行驶车辆的超速行为，从而对驾驶员进行警示教育以及对频繁超速的车辆进行限制入校管控。

要写

## Scope

Describe the scope of the software under consideration by:

a) identifying the software product(s) to be produced by **name** (e.g., Host DBMS, Report Generator, etc.);

b) explaining what the software product(s) will **do**;

c) describing the **application** of the software being specified, including relevant **benefits**, **objectives**

and goals; and

d) being consistent with similar statements in higher-level specifications (e.g., a system requirements specification), if they exist.

【示例】本软件系统称之为“校园超速监控系统”。

该系统会：1) 通过安装在校园关键路段的车速检测器实时监控车辆的车速，并记录车速信息; 2) 识别超出校园安全车速上限的车辆，对驾驶员进行警示教育; 3) 在每季度的最后一天对车速记录进行统计，将超出季度超速次数限制的车辆加入临时黑名单，限制入校; 4) …

通过将该系统部署到校园内，可以实时监控校园内的超速行为，有助于规范校园管理、维护校园安全环境

要写

## Product perspective

**Define the system's relationship to other related products.**

If the product is an element of a larger system, relate the requirements of that larger system to the functionality of the product covered by the SRS.

If the product is an element of a larger system, identify the **interfaces** between the product covered by the SRS and the larger system of which the product is an element.

Consider a block diagram showing the major elements of the larger system, interconnections and external interfaces.

Describe how the software operates within the following constraints:

a) system interfaces;

**b) user interfaces;**

**c) hardware interfaces;**

**d) software interfaces;**

**e) communications interfaces;**

f) memory;

g) operations;

h) site adaptation requirements; and

**i) interfaces with services.**

可将【**软件系统上下文类图】**放置在这里！包括简要的描述和分析。

需要填写的具体内容即下面的1.3.1-1.3.4小节。

要写 – 软件系统上下文类图

### User interfaces

**Specify the logical characteristics of each interface between the software product and its users.**

NOTE A **style guide** for the user interface can provide consistent rules for organization, coding and

interaction of the user with the system.

【示例】PC-based user interface: This interface provides authorized users to access the software system. The **GUI** provides menus, buttons, input boxes, selection boxes, and forms. Users can manage the system by adjusting speed limits, viewing monthly and quarterly reports, and updating personal information such as “phone number” and “address” based on their identity.

Mobile-based user interface: This interface is similar to the PC-based interfaces, but allows for mobile access to the backend management system from authorized devices.

可放置**【GUI界面】**在这里！

要写 – 也可绘制2-3张GUI界面，如功能选择页面、借阅图书页面等，但不强求

### Hardware interfaces

**Specify the logical characteristics of each interface between the software product and the hardware elements of the system.** This includes configuration characteristics (number of ports, instruction sets, etc.). It also covers such matters as what devices are to be supported, how they are to be supported, and protocols. For example, terminal support may specify full-screen support as opposed to line-by-line support.

【示例】Vehicle speed detection sensor interface: The software should be capable of receiving data from multiple vehicle speed detection sensors.

Vehicle speed display interface: The software should be able to display the speed and whether the speed is exceeded by vehicle speed display units.

PC and Mobile device interface: The software should be able to access the backend server through both mobile devices and personal computers.

有则写

### Software interfaces

**Specify the use of other required software products (e.g., a data management system, an operating system, or a mathematical package), and interfaces with other application systems (e.g., the linkage between an accounts receivable system and a general ledger system).**

For each required software product, specify:

a) name;

b) mnemonic;

c) specification number;

d) version number; and

e) source.

NOTE It is acceptable to specify required platforms or operating systems, but rarely feasible to require a specific version. Typically, a version number most recent version or any currently maintain version can be specified for software.

For each interface, specify:

a) discussion of the purpose of the interfacing software as related to this software product;

b) definition of the interface in terms of message content and format. It is not necessary to detail any well-documented interface, but a reference to the document defining the interface is required.

【示例】Interface to SMS System:

a) Purpose: To send SMS notifications to drivers who exceed the safe speed limit.

b) Message content: SMS messages containing notification of speeding violations and educational messages regarding safe driving practices.

Interface to Campus Employee Information System:

a) Purpose: To get employee information.

b) Message content: Requests for employee information.

可添加如下软件产品:

Operating System

a) Name: Linux

b) Specification number: POSIX

c) Version number: CentOS 6.5

d) Source: Open source

Data Management System

a) Name: MySQL

b) Version number: 5.2.7

c) Source: Open source

要写 – 外部系统、数据库系统、操作系统

### Communications interfaces

Specify the various interfaces to communications such as local network protocols.

本系统中没有特别指定，下面仅供参考: **// e.g., SYSU-Secure校园网**

【示例】Local Network Protocols: This interface enables the communication between the software system and other systems on the local network, such as the vehicle registration system or employee information system.

要写

## Product functions

**Provide a summary of the major functions that the software will perform.** For example, an SRS for an accounting program may use this part to address customer account maintenance, customer statement and invoice preparation **without mentioning the vast amount of detail that each of those functions requires**. Sometimes the function summary that is necessary for this part can be taken directly from the section of the higher-level specification (if one exists) that allocates particular functions to the software product.

**Use cases**, user stories, and scenarios are also used to describe product functions.

Note that for the sake of clarity:

a) the product functions should be organized in a way that makes the list of functions understandable to the acquirer or to anyone else reading the document for the first time.

b) textual or **graphical methods** can be used to show the different functions and their relationships. Such a **diagram** is not intended to show a design of a product, but simply shows the logical relationships among variables.

【示例】Speed monitoring: The software will monitor the speed of vehicles passing through key locations within the campus.

Detection of over-speeding: The software will detect vehicles that exceed the safe speed limit and flag them for further action.

Storing detection records: The software will store the detection records including the license plate number, time of detection, location, and speed in the system.

Sending SMS notifications: The software will send SMS notifications to the driver of the over-speeding vehicle or the responsible authority of the driver's department as per the settings configured in the backend management system.

Managing authorized users: The software will allow only authorized users from the campus security department to access the backend management system, which can be accessed through both PC and mobile devices.

Reporting and statistics: The software will generate monthly and quarterly reports of over-speeding incidents and provide the ability to view detailed records of vehicles, drivers, and locations.

Configuration and customization: The software will provide the campus security department with the ability to configure the safe speed limit, over-speeding thresholds for SMS notifications, and manage user accounts.

将**【用例建模】**放在这里！

要写 – 整个系统的用例图（**可提炼**包含用例）+每个用例的用例描述

## User characteristics

**Describe those general characteristics of the intended groups of users of the product including characteristics that may influence usability, such as educational level, experience, disabilities, and technical expertise.** This description should not state-specific requirements, but rather should state the reasons why certain specific requirements are later specified in specific requirements in 9.6.9.

【示例】The intended groups of users of the product are mainly the authorized personnel of the campus security department, including officials and ordinary staff members. They should have basic computer skills and knowledge of operating a web-based system.

要写

## Definitions

Provide definitions for any words or phrases that have special meanings beyond normal dictionary

definitions.

【示例】Campus Speed Monitoring System: A software system designed to monitor the speed of vehicles in a campus environment and identify vehicles that exceed the defined safe speed limit. Also, it provides administrative functions, including data storage, user management, and configuration management.

有则写，不要求

## Acronyms and Abbreviations

Spell out or define all acronyms and abbreviations used in the documents.

NOTE This information can be provided by reference to one or more appendixes in the documents or by

reference to other documents.

【示例】PC: Personal Computer

SMS: Short Message Service

有则写，不要求

# Requirements

## External interfaces

**Define all inputs into and outputs from the software system.** The description should complement the interface descriptions in 9.6.4.1 through 9.6.4.5, and should not repeat information there.

Each interface defined should include the following content:

a) name of item;

b) description of purpose;

c) source of input or destination of output;

d) valid range, accuracy and/or tolerance;

e) units of measure;

f) timing;

g) relationships to other inputs/outputs;

h) data formats;

i) command formats; and

j) data items or information included in the input and output.

【示例】Vehicle Speed Detector Interface:

**a) Purpose**: Detects the speed of vehicles passing through key points in the campus

**b) Source/Destination**: Inputs from passing vehicles, outputs to the Speed Display and Back-end Management System

**c) Valid Range/Accuracy/Tolerance**: Should accurately detect speeds up to 100 km/h with an accuracy of at least +/- 5 km/h

**d) Units of measure**: Kilometers per hour (km/h)

**3) Timing**: Real-time

**4) Relationships to other inputs/outputs**: Outputs data to the Speed Display and Management System

**5) Data formats**: Digital signal

**6) Command formats**: N/A

**7) Data items or information included in the input**: Vehicle speed, detection time, location

SMS System Interface:

Purpose: Send SMS messages to drivers who exceed the campus speed limit and to notify authorized personnel of temporary vehicles entering the campus.

Source/Destination: Inputs from the Backend Management System, outputs to drivers

Valid Range/Accuracy/Tolerance: N/A

Units of measure: N/A

Timing: Real-time and scheduled (monthly and quarterly reports)

Relationships to other inputs/outputs: Receives data from the management system, outputs data to SMS Sending System

Data formats: Text message

Command formats: N/A

Data items or information included in the input and output: Driver information, violation information, approved vehicle information, messages for warning education and notification

有则写，不要求

## Functions

**Define the fundamental actions that have to take place in the software in accepting and processing the inputs and in processing and generating the outputs**, including:

**a) validity checks on the inputs;**

**b) exact sequence of operations;**

**c) responses to abnormal situations**, including:

1) overflow;

2) communication facilities;

3) hardware faults and failures; and

4) error handling and recovery;

d) effect of parameters;

e) relationship of outputs to inputs, including:

1) input/output sequences; and

2) formulas for input-to-output conversion.

It may be appropriate to partition the functional requirements into sub-functions or sub-processes.

This does not imply that the software design will also be partitioned that way.

将**【动态交互建模】**放在这里！

要写 – 每位同学写一个用例的通信图+消息序列描述即可，但要与前面系统的用例图对应。如果提炼了包含用例，那么单独绘一个包含用例（如验证校园卡）的通信图及消息序列描述，然后具体用例（如借阅）的通信图及消息序列描述可以从包含用例之后开始。// 参考教材银行系统的验证PIN、取款用例的处理

说明：大家如果想要完成系统全部用例的动态交互建模是可以的，但需要明确指明2-3个是用于评分的用例，其余的用例将不用作评分。

## Performance requirements

Specify both the static and the dynamic numerical requirements placed on the software or on human interaction with the software as a whole.

Static numerical requirements may include the following:

a) the number of terminals to be supported;

b) the number of simultaneous users to be supported; and

c) the amount and type of information to be handled.

Static numerical requirements are sometimes identified under a separate section entitled Capacity. Dynamic numerical requirements may include, for example, the number of transactions and tasks and the amount of data to be processed within certain time periods for both normal and peak workload conditions.

The performance requirements should be stated in measurable terms.

For example,

95 % of the transactions shall be processed in less than 1 s.

rather than,

*An operator shall not have to wait for the transaction to complete.*

NOTE Numerical limits applied to one specific function are normally specified as part of the processing subparagraph description of that function.

有则写，不要求

## Logical database requirements

Specify the logical requirements for any information that is to be placed into a database, including:

a) types of information used by various functions;

b) frequency of use;

c) accessing capabilities;

**d) data entities and their relationships;**

e) integrity constraints;

f) security; and

**g) data retention requirements.**

将**【实体类建模】**放在这里！

要写 – 实体类的关联图+属性图

## Standards compliance

Specify the requirements derived from existing standards or regulations, including:

**a) report format;**

**b) data naming;**

c) accounting procedures; and

d) audit tracing.

For example, this could specify the requirement for software to trace processing activity. Such traces are needed for some applications to meet minimum regulatory or financial standards. An audit trace requirement may, for example, state that all changes to a payroll database shall be recorded in a trace file with before and after values.

有则写，不要求

## Software system attributes

Specify the required attributes of the software product. The following is a partial list of examples:

a) **Reliability** - specify the factors required to establish the required reliability of the software system at the time of delivery.

b) **Availability** - specify the factors required to guarantee a defined availability level for the entire system such as checkpoint, recovery and restart.

c) **Security** - specify the requirements to protect the software from accidental or malicious access, use modification, destruction, or disclosure. Specific requirements in this area could include the need to:

1) utilize certain cryptographic techniques;

2) keep specific log or history data sets;

3) assign certain functions to different modules;

4) restrict communications between some areas of the program;

5) check data integrity for critical variables; and

6) assure data privacy.

d) **Maintainability** - specify attributes of software that relate to the ease of maintenance of the software itself. These may include requirements for certain modularity, interfaces, or complexity limitation. Requirements should not be placed here just because they are thought to be good design practices.

e) **Portability** - specify attributes of software that relate to the ease of porting the software to other

host machines and/or operating systems, including:

1) percentage of elements with host-dependent code;

2) percentage of code that is host dependent;

3) use of a proven portable language;

4) use of a particular compiler or language subset; and

5) use of a particular operating system.

有则写，不要求

# Supporting information

Additional supporting information to be considered includes:

**a) sample input/output formats, descriptions of cost analysis studies, or results of user surveys;**

b) supporting or background information that can help the readers of the SRS;

**c) a description of the problems to be solved by the software**; and

d) special packaging instructions for the code and the media to meet security, export, initial loading

or other requirements.

The SRS should explicitly state whether or not these information items are to be considered part of the requirements.

有则写，不要求

# References

Include the following information regarding references:

**a) provide a complete list of all documents referenced elsewhere;**

b) identify each document by title, report number (if applicable), date, and publishing organization; and

c) specify the sources from which the references can be obtained.

有则写，不要求