

PA-193: SECURE CODING PRINCIPLES AND PRACTICES

TIFF IMAGE PARSER

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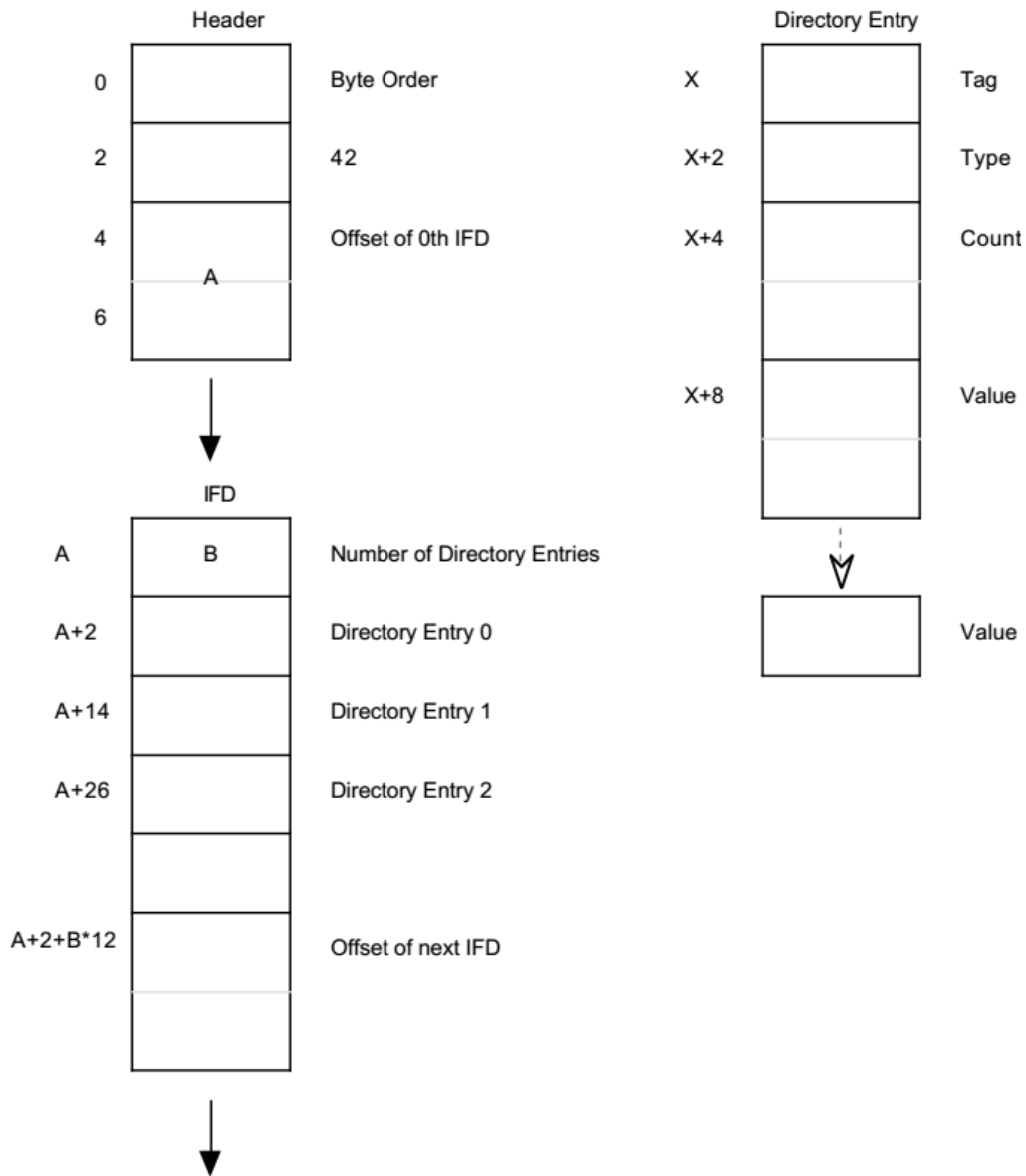
SCOPE

- To read TIFF 6.0 Image Header
- Parse the following:
 - Byte Order
 - TIFF Format ID
 - Image File Directory (IFD) Offset
 - Number of Directory Entries
 - Values in each Directory Entry

INTRODUCTION

- TIFF
 - Tagged Image File Format
 - is a file format for storing raster graphics images
 - Rectangular grid of pixels
 - popular among graphic artists, the publishing industry, and photographers
 - a *file* is defined to be a sequence of 8-bit bytes
 - bytes are numbered from 0 to N.
 - largest possible TIFF file is 2^{32} bytes in length.

TIFF HEADER STRUCTURE



SAMPLE BILEVEL TIFF FILE

Offset (hex)	Description	Value (numeric values are expressed in hexadecimal notation)
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Header:

0000	Byte Order	4D4D
0002	42	002A
0004	1st IFD offset	00000014

IFD:

0014	Number of Directory Entries	000C
0016	NewSubfileType	00FE 0004 00000001 00000000
0022	ImageWidth	0100 0004 00000001 000007D0
002E	ImageLength	0101 0004 00000001 00000BB8
003A	Compression	0103 0003 00000001 8005 0000
0046	PhotometricInterpretation	0106 0003 00000001 0001 0000
0052	StripOffsets	0111 0004 000000BC 000000B6
005E	RowsPerStrip	0116 0004 00000001 00000010
006A	StripByteCounts	0117 0003 000000BC 000003A6
0076	XResolution	011A 0005 00000001 00000696
0082	YResolution	011B 0005 00000001 0000069E
008E	Software	0131 0002 0000000E 000006A6
009A	DateTime	0132 0002 00000014 000006B6
00A6	Next IFD offset	00000000

Values longer than 4 bytes:

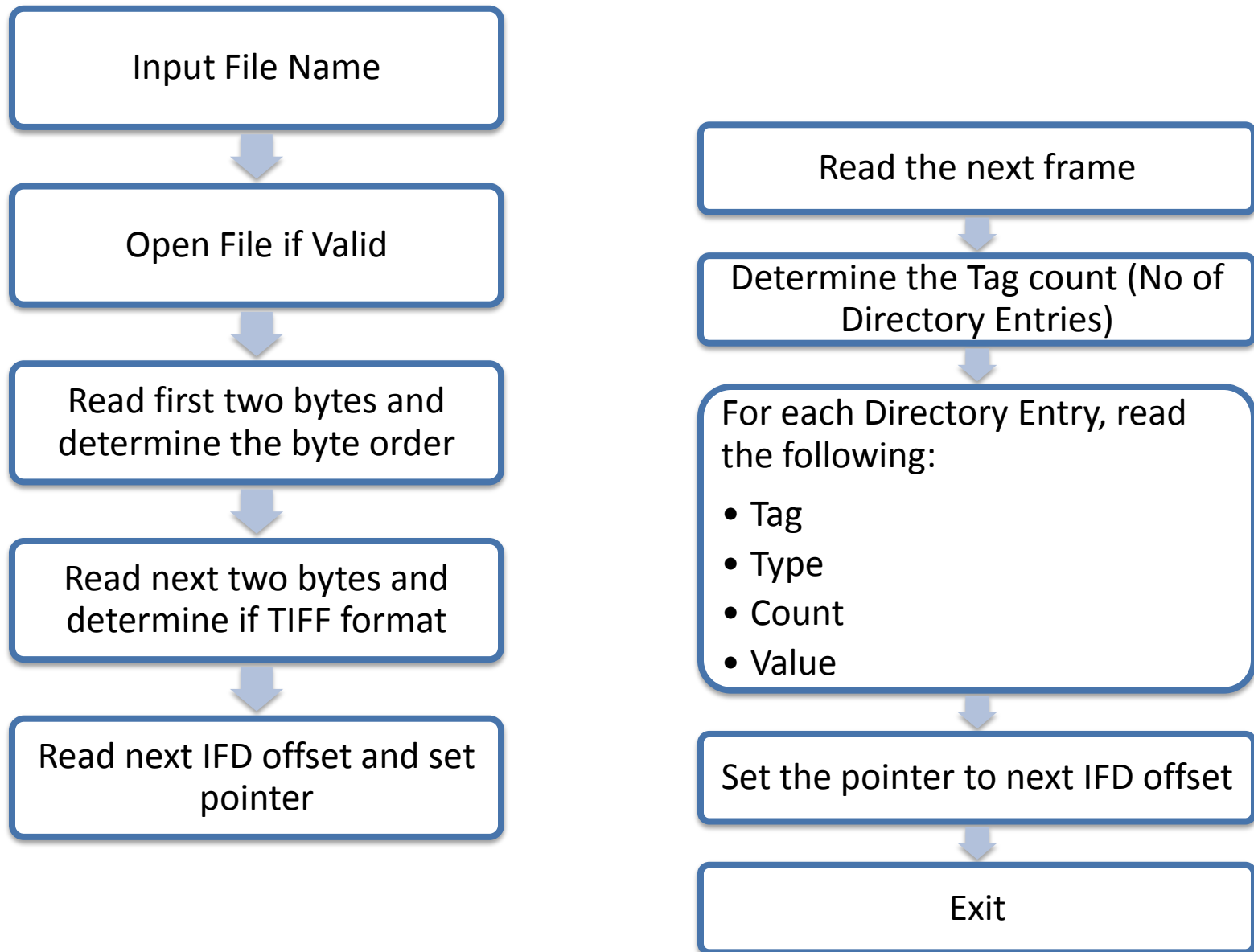
00B6	StripOffsets	Offset0, Offset1, ... Offset187
03A6	StripByteCounts	Count0, Count1, ... Count187
0696	XResolution	0000012C 00000001
069E	YResolution	0000012C 00000001
06A6	Software	"PageMaker 4.0"
06B6	DateTime	"1988:02:18 13:59:59"

TIFF FRAME AND FILE STRUCTURE

```
struct TiffFrame {  
    uint32_t width;  
    uint32_t height;  
    uint16_t compression;  
    uint32_t rowsperstrip;  
    uint32_t* stripoffsets;  
    uint32_t* stripbytecounts;  
    uint32_t stripcount;  
    uint16_t samplesperpixel;  
    uint16_t* bitspersample;  
    uint16_t planarconfiguration;  
    uint16_t sampleformat;  
    uint32_t imagelength;  
};
```

```
struct TiffFile {  
    FILE* file;  
    uint8_t systembyteorder;  
    uint8_t filebyteorder;  
    uint32_t firstrecord_offset;  
    uint32_t nexttfd_offset;  
    uint64_t filesize;  
    TiffFrame currentFrame;  
};
```

STRUCTURE OF CODE



DISTRIBUTION OF WORK

Rajesh Kumar Ashwin A Yakkundi	Conceptualization of flow. Setting the structure of the coding.
Ashwin A Yakkundi Ananya Chatterjee	Understanding the format. Implementation of code.
Rajesh Kumar Ananya Chatterjee	Code Verification and Testing.
Ananya Chatterjee Ashwin A Yakkundi	Sample Data Collection.
Rajesh Kumar Ananya Chatterjee	Setting up of Input Validation.
Ashwin A Yakkundi Rajesh Kumar	Preparation of presentation