

首先, 我先到Linux manual page 找到 errno(3) 的document

<https://man7.org/linux/man-pages/man3/errno.3.html>

errno 是被define於 errno.h , 而errno.h 裡面有所有可能的值
早期電腦中大多的c runtime lib 裡面會有一個變數errno

然而我接著在stackoverflow查了 errno的位置

<https://stackoverflow.com/questions/33989348/where-errno-is-defined-and-allocated-in-c-c>

根據裡面的最佳回答, 在現代有thread的os當中, errno並不是一個一般的variable

```
# ifndef __ASSEMBLER__

/* Function to get address of global `errno' variable. */
extern int *__errno_location (void) __THROW __attribute__((__const__));

# if !defined _LIBC || defined _LIBC_REENTRANT
/* When using threads, errno is a per-thread value. */
#  define errno (*__errno_location ())
# endif
# endif /* !__ASSEMBLER__ */
#endif /* _ERRNO_H */
```

這是一個在 Linux, from /usr/include/bits/errno.h in glibc.裡面的一段Code

errno在每一個thread中會是獨立的value, 因此現代電腦中不能直接說errno就是一個位於某個地方的變數。

而第二題的all error number, 在上述的linux manual page裡面就有完整的list. 在kernel source code 裡面有完整的define

<https://android.googlesource.com/kernel/lk/+dima/for-travis/include/errno.h>

```
#define      EPERM 1          /* Not super-user */
#define      ENOENT 2        /* No such file or directory */
#define      ESRCH 3          /* No such process */
#define      EINTR 4          /* Interrupted system call */
#define      EIO 5           /* I/O error */
#define      ENXIO 6          /* No such device or address */
#define      E2BIG 7          /* Arg list too long */
#define      ENOEXEC 8        /* Exec format error */
#define      EBADF 9          /* Bad file number */
#define      ECHILD 10        /* No children */
#define      EAGAIN 11        /* No more processes */
#define      ENOMEM 12        /* Not enough core */
#define      EACCES 13        /* Permission denied */
#define      EFAULT 14        /* Bad address */
#define      ENOTBLK 15       /* Block device required */
#define      EBUSY 16         /* Mount device busy */
#define      EEXIST 17        /* File exists */
```

```

#define EXDEV 18 /* Cross-device link */
#define ENODEV 19 /* No such device */
#define ENOTDIR 20 /* Not a directory */
#define EISDIR 21 /* Is a directory */
#define EINVAL 22 /* Invalid argument */
#define ENFILE 23 /* Too many open files in system */
#define EMFILE 24 /* Too many open files */
#define ENOTTY 25 /* Not a typewriter */
#define ETXTBSY 26 /* Text file busy */
#define EFBIG 27 /* File too large */
#define ENOSPC 28 /* No space left on device */
#define EPIPE 29 /* Illegal seek */
#define EROFS 30 /* Read only file system */
#define EMLINK 31 /* Too many links */
#define EPIPE 32 /* Broken pipe */
#define EDOM 33 /* Math arg out of domain of func */
#define ERANGE 34 /* Math result not representable */
#define ENOMSG 35 /* No message of desired type */
#define EIDRM 36 /* Identifier removed */
#define ECHRNG 37 /* Channel number out of range */
#define EL2NSYNC 38 /* Level 2 not synchronized */
#define EL3HLT 39 /* Level 3 halted */
#define EL3RST 40 /* Level 3 reset */
#define ELNRNG 41 /* Link number out of range */
#define EUNATCH 42 /* Protocol driver not attached */
#define ENOCSI 43 /* No CSI structure available */
#define EL2HLT 44 /* Level 2 halted */
#define EDEADLK 45 /* Deadlock condition */
#define ENOLCK 46 /* No record locks available */
#define EBADE 50 /* Invalid exchange */
#define EBADR 51 /* Invalid request descriptor */
#define EXFULL 52 /* Exchange full */
#define ENOANO 53 /* No anode */
#define EBADRQC 54 /* Invalid request code */
#define EBADSLT 55 /* Invalid slot */
#define EDEADLOCK 56 /* File locking deadlock error */
#define EBFONT 57 /* Bad font file fmt */
#define ENOSTR 60 /* Device not a stream */
#define ENODATA 61 /* No data (for no delay io) */
#define ETIME 62 /* Timer expired */
#define ENOSR 63 /* Out of streams resources */
#define ENONET 64 /* Machine is not on the network */
#define ENOPKG 65 /* Package not installed */
#define EREMOTE 66 /* The object is remote */
#define ENOLINK 67 /* The link has been severed */
#define EADV 68 /* Advertise error */
#define ESRMNT 69 /* Srmount error */
#define ECOMM 70 /* Communication error on send */

```

```

#define EPROTO 71 /* Protocol error */
#define EMULTIHOP 74 /* Multihop attempted */
#define ELBIN 75 /* Inode is remote (not really error) */
#define EDOTDOT 76 /* Cross mount point (not really error) */
#define EBADMSG 77 /* Trying to read unreadable message */
#define EFTYPE 79 /* Inappropriate file type or format */
#define ENOTUNIQU 80 /* Given log. name not unique */
#define EBADFD 81 /* f.d. invalid for this operation */
#define EREMCHG 82 /* Remote address changed */
#define ELIBACC 83 /* Can't access a needed shared lib */
#define ELIBBAD 84 /* Accessing a corrupted shared lib */
#define ELIBSCN 85 /* .lib section in a.out corrupted */
#define ELIBMAX 86 /* Attempting to link in too many libs */
#define ELIBEXEC 87 /* Attempting to exec a shared library */
#define ENOSYS 88 /* Function not implemented */
#define ENMFILE 89 /* No more files */
#define ENOTEMPTY 90 /* Directory not empty */
#define ENAMETOOLONG 91 /* File or path name too long */
#define ELOOP 92 /* Too many symbolic links */
#define EOPNOTSUPP 95 /* Operation not supported on transport endpoint */
#define EPNOSUPPORT 96 /* Protocol family not supported */
#define ECONNRESET 104 /* Connection reset by peer */
#define ENOBUFS 105 /* No buffer space available */
#define EAFNOSUPPORT 106 /* Address family not supported by protocol family */
#define EPROTOTYPE 107 /* Protocol wrong type for socket */
#define ENOTSOCK 108 /* Socket operation on non-socket */
#define ENOPROTOOPT 109 /* Protocol not available */
#define ESHUTDOWN 110 /* Can't send after socket shutdown */
#define ECONNREFUSED 111 /* Connection refused */
#define EADDRINUSE 112 /* Address already in use */
#define ECONNABORTED 113 /* Connection aborted */
#define ENETUNREACH 114 /* Network is unreachable */
#define ENETDOWN 115 /* Network interface is not configured */
#define ETIMEDOUT 116 /* Connection timed out */
#define EHOSTDOWN 117 /* Host is down */
#define EHOSTUNREACH 118 /* Host is unreachable */
#define EINPROGRESS 119 /* Connection already in progress */
#define EALREADY 120 /* Socket already connected */
#define EDESTADDRREQ 121 /* Destination address required */
#define EMSGSIZE 122 /* Message too long */
#define EPROTONOSUPPORT 123 /* Unknown protocol */
#define ESOCKTNOSUPPORT 124 /* Socket type not supported */
#define EADDRNOTAVAIL 125 /* Address not available */
#define ENETRESET 126
#define EISCONN 127 /* Socket is already connected */
#define ENOTCONN 128 /* Socket is not connected */
#define ETOOMANYREFS 129
#define EPROCLIM 130

```

```

#define EUSERS 131
#define EDQUOT 132
#define ESTALE 133
#define ENOTSUP 134 /* Not supported */
#define ENOMEDIUM 135 /* No medium (in tape drive) */
#define ENOSHARE 136 /* No such host or network path */
#define ECASECLASH 137 /* Filename exists with different case */
#define EILSEQ 138
#define EOVERFLOW 139 /* Value too large for defined data type */
#define EWOULDBLOCK EAGAIN /* Operation would block */
#define __ELASTERROR 2000 /* Users can add values starting here */

```

最後一小題則是 使用 perror

我一樣先去看 linux manual page

<https://man7.org/linux/man-pages/man3/perror.3.html>

於是我照著他的規定寫了一個

```

1  #include <stdio.h>
2  #include <errno.h>
3
4
5  int main () {
6
7      FILE *perror_test = fopen("Hello.txt","r");
8      if( perror_test == NULL ) {
9          perror("Error: ");
10         return(-1);
11     }
12     fclose(perror_test);
13
14     return(0);
15 }

```

```

PS C:\Users\naoyt\Desktop\file\C++\general> .\test.exe
Error: : No such file or directory
PS C:\Users\naoyt\Desktop\file\C++\general> 

```

但這時我發現題目要我們define a new errno number

```
1  ✓ #include <stdio.h>
2  #include <errno.h>
3  #define myerrno 1235345
4
5  ✓ int main () {
6
7      errno = myerrno;
8      perror("ERROR: ");
9
10     return(0);
11 }
```

```
PS C:\Users\naoyt\Desktop\file\Cpp\general> .\test.exe
ERROR: : Unknown error
PS C:\Users\naoyt\Desktop\file\Cpp\general> 
```

結果就會變成系統不知道這個錯誤代碼為甚麼