

C functions for strings:

```
size_t strlen(const char *s);
int strncmp(const char *s1, const char *s2, size_t n);
char *strncpy(char *dest, const char *src, size_t n);
char *strncat(char *dest, const char *src, size_t n);
char *index(const char *s, int c);
char *strchr(const char *s, int c);
char *strstr(const char *haystack, const char *needle);
```

C functions for files and directories:

```
int closedir(DIR *dir);
int fclose(FILE *stream);
char *fgets(char *s, int n, FILE *stream);
FILE *fopen(const char *file, const char *mode);
int fprintf(FILE *stream, const char *format, ...);
char *getcwd(char *buf, size_t size);
DIR *opendir(const char *name);
struct dirent *readdir(DIR *dir);
int stat(const char *file name, struct stat *buf);
void perror(const char *s);
```

```
struct stat {
    dev_t      st_dev;      /* device */
    ino_t      st_ino;     /* inode */
    mode_t     st_mode;    /* protection */
    nlink_t    st_nlink;   /* number of hard links */
    off_t      st_size;    /* total size, in bytes */
    unsigned long st_blksize; /* blocksize for filesystem I/O */
    unsigned long st_blocks; /* number of blocks allocated */
    time_t     st_atime;   /* time of last access */
    time_t     st_mtime;   /* time of last modification */
    time_t     st_ctime;   /* time of last change */
};
```

The following POSIX macro functions are defined to check the file type (`m` is the `st_mode` field of the `stat` struct):

`S_ISLNK(m)` is it a symbolic link?

`S_ISREG(m)` regular file?

`S_ISDIR(m)` directory?

Shell variables:

`$$` shell process ID

`$?` last exit status

`#` number of arguments

`*` all arguments as string

`"@"` all arguments as quoted list

Shell test comparison operators:

Shell	Description
<code>-d filename</code>	Exists as a directory
<code>-f filename</code>	Exists as a regular file.
<code>-r filename</code>	Exists as a readable file
<code>-w filename</code>	Exists as a writable file.
<code>-x filename</code>	Exists as an executable file.
<code>-z string</code>	True if empty string
<code>str1 = str2</code>	True if str1 equals str2
<code>str1 != str2</code>	True if str1 not equal to str2
<code>int1 -eq int2</code>	True if int1 equals int2
<code>-ne, -gt, -ge, -lt, -le</code>	Comparisons for numbers
<code>!=, >, >=, <, <=</code>	Comparisons for strings
<code>-a, -o</code>	And, or.