Princeton University
COS 217: Introduction to Programming Systems
Manipulating C Strings

String Operation	String in Stack	String in Rodata Section

Allocating memory for a string	`{`
	`  char ac[5];`
	`  ...`
	`}`
		`{`
		`  ...`
		`  ..."hi"...`
		`  ...`
		`}`

Initializing a string	`{`
	`  char acA[3] = {'h', 'i', '\0'};`
	`  char acB[] = {'h', 'i', '\0'};`
	`  char acC[2] = {'h', 'i', '\0'};`
	`  **/* Warning and truncation. */**`
	`  char acD[10] = {'h', 'i', '\0'};`
	`  char acE[3] = "hi";`
	`  char acF[] = "hi";`
	`  char acG[1] = "hi";`
	`  **/* Warning and truncation. */**`
	`  char acH[2] = "hi";`
	`  **/* Truncation. */**`
	`  char acI[10] = "hi";`
	`  ...`
	`}`
		`{`
		`  ...`
		`  ..."hi"...`
		`  ...`
		`}`

Computing the length of a string	`{`
	`  char ac[10] = "hello";`
	
	`  /* Evaluates to 5 */`
	`  ... strlen(ac) …`
	
	`  /* Evaluates to 10 */`
	`  ... sizeof(ac) ...`
	`}`
		`{`
		`  char *pc = "hello";`
		
		`  /* Evaluates to 5 */`
		`  ... strlen(pc) ...`
		
		`  /* Evaluates to 4 */`
		`  ... sizeof(pc) ...`
		`}`

Changing the characters of a string	`{`
	`  char ac[10] = "hi";`
	
	`  /* Compile-time error. */`
	`  ac = "bye";`
	
	`  /* The long way. */`
	`  ac[0] = 'b';`
	`  ac[1] = 'y';`
	`  ac[2] = 'e';`
	`  ac[3] = '\0';`
	
	`  /* The shortcut. */`
	`  strcpy(ac, "bye");  **/* Dangerous. */**`
	`}`
		(Runtime error to attempt to change the characters of a string that resides in the rodata section)

Concatenating characters onto a string	`{`
	`  char ac[10] = "hi";`
	
	`  /* Compile-time error. */`
	`  ac += "bye";`
	
	`  /* The long way. */`
	`  ac[2] = 'b';`
	`  ac[3] = 'y';`
	`  ac[4] = 'e';`
	`  ac[5] = '\0';`
	
	`  /* The shortcut. */`
	`  strcat(ac, "bye");  **/* Dangerous. */**`
	`}`
		(Runtime error to attempt to change the characters of a string that resides in the rodata section)

Comparing one string with another	`{`
	`  char acA[] = "hi";`
	`  char acB[] = "bye";`
	
	`  /* Legal, but compares addresses!!! */`
	`  if (acA < acB) ...`
	
	`  /* Compares strings */`
	`  if (strcmp(acA, acB) < 0) ...`
	`}`
		(Same as string in stack)

Reading a string	`{`
	`  char ac[10];`
	
	`  /* Reads a word as a string. */`
	`  iConvCount = scanf("%s", ac);`
	`  **/* Dangerous. */**`
	
	`  /* Reads a line as a string,`
	`  removing the \n character. */`
	`  iRet = gets(ac);`
	`  **/* Dangerous. */**`
	
	`  /* Reads a line as a string,`
	`  retaining the \n character. */`
	`  iRet = fgets(ac, 10, stdin);`
	`}`
		(Runtime error to attempt to change the characters of a string that resides in the rodata section)

Writing a string	`{`
	`  char ac[] = "hi";`
	
	`  /* Writes a string. */`
	`  iCharCount = printf("%s", acStr);`
	
	`  /* Writes a string, appending a \n`
	`  character. */`
	`  iSuccessful = puts(ac);`
	
	`  /* Writes a string. */`
	`  iSuccessful = fputs(ac, stdout);`
	`}`
		(Same as string in stack)

Converting a string to another type	`{`
	`  char ac[] = "123";`
	`  int i;`
	`  long l;`
	`  double d;`
	`  iConvCount = sscanf(ac, "%d", &i);`
	`  i = atoi(ac);`
	`  l = atol(ac);`
	`  d = atof(ac);`
	`}`
		(Same as string in stack)

Converting another type to a string	`{`
	`  char ac[10];`
	`  int i = 123;`
	`  iCharCount = sprintf(ac, "%d", i);`
	`  **/* Dangerous. */**`
	`}`
		(Runtime error to attempt to change the characters of a string that resides in the rodata section)