

Hindawi Indic Programming System Release 2.1 (Linux) Version 0.1.2 Alpha User Guide and Reference Manual

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हिंदवी क्रमानुशीलन प्रणाली

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लघु संकलित विकास क्षेत्र से परिचय

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## १. प्रोग्राम खण्ड (Source code)

इस खण्ड में प्रोग्राम लिखें अथवा निवेश करें।

## २. प्रोग्राम खातानाम प्रविष्टि खण्ड (Source filename)

पूर्वासित खाते से प्रोग्राम प्रविष्ट करने के लिए खातानाम यहाँ लिखें।

### ३. प्रोग्राम खातानाम चयन बटन (**Source select**)

प्रोग्राम खातानाम चयन करने के लिए यह बटन दबाएँ। चयनित खातानाम प्रोग्राम खातानाम प्रविष्टि खण्ड में स्वतः प्रविष्ट हो जाएगा। निवेश करें बटन दबाने पर वह खाता प्रोग्राम खण्ड में दिखेगा।

### ४. नया बटन (**New**)

यह बटन दबाने पर सब प्रविष्टि खण्ड साफ हो जाएँगे। नया प्रोग्राम लिखने के पूर्व यह बटन अवश्य दबाएँ।

### ५. संचय करें बटन (**Save**)

यह बटन दबाने पर प्रोग्राम खण्ड में लिखा पाठ प्रोग्राम खातानाम प्रविष्टि खण्ड में लिखे खातानाम में संचित हो जाएगा। संकलन के पूर्व यह बटन अवश्य दबाएँ।

### ६. निवेश करें बटन (**Open**)

यह बटन दबाने पर प्रोग्राम खातानाम प्रविष्टि खण्ड में चयनित खाता प्रोग्राम खण्ड में दिखेगा।

### ७. संकलन बटन (**Compile**)

प्रोग्राम संकलन के लिए यह बटन दबाएँ। परिक्षण / प्रसार के पूर्व यह बटन अवश्य दबाएँ।

### ८. परिक्षण बटन (**Run in IDE**)

यह बटन दबाने पर प्रोग्राम के परिणाम लघु सवक्ष के परिणाम खण्ड में दिखेंगे।

### ९. प्रसार बटन (**Run on external shell**)

यह बटन दबाने पर प्रोग्राम के परिणाम बाह्य खण्ड में दिखेंगे।

### १०. परिणाम खण्ड (**Output - stdout**)

प्रोग्राम के परिणाम यहाँ देखें।

### ११. संकलन त्रुटि खण्ड (**Compilation errors**)

संकलन की त्रुटियाँ यहाँ देखें।

### १२. प्रविष्टि खण्ड (**Input - stdin**)

प्रोग्राम की अपेक्षित प्रविष्टियाँ यहाँ लिखें।

### १३. सहायता बटन (**Help**)

सहायता के लिए यह बटन दबाएँ।

### १४. निकास बटन (**Exit**)

निकास के लिए यह बटन दबाएँ।

### शैली प्राथमिक शब्दकोष (**Shaili Praathamik command reference**)

~~~~~

| | |
|---------|---------------|
| टिप्पणी | REM |
| टिप | REM |
| साफ | CLS |
| स्थान | LOCATE |

| | |
|---------------|-----------|
| लिखो | PRINT |
| पूछो | INPUT |
| रंग | COLOR |
| रंगकोष | PALETTE |
| चित्र_लिखो | XTEXT |
| दिनांक\$ | DATE\$ |
| समय\$ | TIME\$ |
| खाली\$ | SPACE\$ |
| बीच\$ | MID\$ |
| पूर्व\$ | LEFT\$ |
| अंत\$ | RIGHT\$ |
| माला\$ | STRING\$ |
| अंक_माला | STR |
| लिपी\$ | CHR\$ |
| बड़े\$ | UCASE\$ |
| छोटे\$ | LCASE\$ |
| पूर्वक्षय\$ | LTRIM\$ |
| अंतक्षय\$ | RTRIM\$ |
| अंश | INSTR |
| इस्कि | ASC |
| इस | ASC |
| मान | VAL |
| माप | LEN |
| षष्ठ\$ | HEX\$ |
| षष्ठदशक\$ | HEX\$ |
| अष्ट\$ | OCT\$ |
| आष्टक\$ | OCT\$ |
| चाबी\$ | INKEY\$ |
| चाबी_दबाया\$ | INKEY\$ |
| च_दबाया\$ | INKEY\$ |
| | |
| घड़ी | TIMER |
| समयक | TIMER |
| बेक्रम_क्रिया | RANDOMIZE |
| अक्रम_क्रिया | RANDOMIZE |
| | |
| मानो | LET |
| आयाम | DIM |
| सार्वजनिक | SHARED |
| सार्व | SHARED |
| स्थिर | CONST |
| | |
| अगर | IF |
| है तो | THEN |
| हो तो | THEN |
| अन्यथा | ELSE |
| | |
| क्रम | FOR |

| | |
|------------|--------------|
| से | TO |
| गति | STEP |
| क्रमान्त | NEXT |
| करो | DO |
| दोहराओ | LOOP |
| फिर | LOOP |
| जब तक | WHILE |
| तब तक | WEND |
| खोलो | OPEN |
| हेतु | FOR |
| पाठ | INPUT |
| लेखन | OUTPUT |
| नत्थी | APPEND |
| पंथ | AS |
| बंद | CLOSE |
| खाता_पूर्ण | EOF |
| ख_प | EOF |
| पूर्वासित | EXISTS |
| खाता_लिखो | PRINT # |
| ख_लिखो | PRINT # |
| खाता_पढ़ो | LINE INPUT # |
| ख_पढ़ो | LINE INPUT # |
| खाता_शब्द | INPUT # |
| ख_शब्द | INPUT # |
| पूर्ण | END |
| इति | END |
| समाप्त | END |
| अवकाश | SHELL |
| अगला | GOTO |
| जाओ | GOSUB |
| वापस | RETURN |
| क्रिया | FUNCTION |
| अणु | SUB |
| निकास | EXIT SUB |
| अवरोध | BREAK |
| जारी रखो | CONTINUE |
| जड़ | STATIC |
| घोषणा | DECLARE |
| घोष | DECLARE |
| अनुक्रम | CALL |
| लॉग | LOG |

| | |
|-------------|-----------|
| साइन | SIN |
| कोस | COS |
| टैन | TAN |
| अटैन | ATN |
| मूल | SQR |
| वर्गमूल | SQR |
| सम | ABS |
| समपूर्ण | ABS |
| प्रतिपादक | EXP |
| चिह्न | SGN |
| अक्रमान्क | RND |
| अंक | INT |
| पूर्णांक | CINT |
| शेष | MOD |
| | |
| पर्दा | SCREEN |
| वृत्त | CIRCLE |
| रेखा | LINE |
| बिन्दु | PSET |
| | |
| तथा | AND |
| और | AND |
| और_बिट | & |
| और_ब | & |
| या | OR |
| या_बिट | |
| या_ब | |
| नहीं | NOT |
| अथवा | XOR |
| केवल | XOR |
| | |
| #गस | C header |
| #गम | C main |
| #ग | C |
| | |
| पूर्वदिशे\$ | COMMAND\$ |

शैली गुरु शब्दकोष (Shaili Guru command reference)

~~~~~

मुख्य	main
प्राथमिक.स	basstub.c
भाग.स	alloc.h
निश्चित.स	assert.h
मूलप्रण.स	bios.h
पट्टपन.स	conio.h
प्रकार.स	ctype.h

---

सूची.स	dir.h
डॉस.स	dos.h
त्रुटिसं.स	errno.h
भग्न.स	float.h
पन.स	io.h
सीमा.स	limits.h
क्षेत्र.स	locale.h
गणित.स	math.h
स्मृति.स	mem.h
क्रिया.स	process.h
समलौघ.स	setjmp.h
संकेत.स	signal.h
मानकतर्क.स	stdarg.h
मानकघोष.स	stddef.h
मानकपन.स	stdio.h
मानककोष.स	stdlib.h
माला.स	string.h
स्थिति.स	stat.h
समय.स	time.h
ब_समय.स	timeb.h

अणु	{
पूर्ण	}
#घोषणा	#define
#या_अगर	#elif
#अन्यथा	#else
#पूर्ण_अगर	#endif
#त्रुटि	#error
#अगर	#if
#अगर_घोषित	#ifdef
#अगर_अघोषित	#ifndef
#समावेश	#include
#पंक्ति	#line
#आशय	#pragma
#अघोषित	#undef
बफ_मान	BUFSIZ
अक्षर_बिट	CHAR_BIT
अक्षर_उच्च	CHAR_MAX
अक्षर_न्यून	CHAR_MIN
शिशु_उच्च	CHILD_MAX
घड़ी_टिक	CLK_TCK
द्विग_भग्न	DBL_DIG
द्विग_अंतर	DBL_EPSILON
द्विग_पूर्ण	DBL_MANT_DIG
द्विग_उच्च	DBL_MAX
द्विग_न्यून	DBL_MIN
सूची	DIR
गलत_तर्क	EDOM

---

खातापूर्ण	EOF
दुस्फल	ERANGE
निकास_त्रुटि	EXIT_FAILURE
निकास_सफल	EXIT_SUCCESS
खाता	FILE
खातानाम_उच्च	FILENAME_MAX
भग्न_भग्न	FLT_DIG
भग्न_अंतर	FLT_EPSILON
भग्न_पूर्ण	FLT_MANT_DIG
भग्न_उच्च	FLT_MAX
भग्न_न्यून	FLT_MIN
भग्न_आधार	FLT_RADIX
ख_खोलो_उच्च	FOPEN_MAX
विशाल_मान	HUGE_VAL
अनन्त	INFINITY
पूर्णांक_उच्च	INT_MAX
पूर्णांक_न्यून	INT_MIN
द_द्वि_भग्न	LDBL_DIG
द_द्वि_अंतर	LDBL_EPSILON
द_द्वि_पूर्ण	LDBL_MANT_DIG
द_द्वि_उच्च	LDBL_MAX
द_द्वि_न्यून	LDBL_MIN
दीर्घ_उच्च	LONG_MAX
दीर्घ_न्यून	LONG_MIN
ब_क्षणिक	L_tmpnam
न_अंक	NAN
न_संशोधन	NDEBUG
शून्य	NULL
अक्रम_उच्च	RAND_MAX
च_अक्षर_उच्च	SCHAR_MAX
च_अक्षर_न्यून	SCHAR_MIN
प्रस्तुत_से	SEEK_CUR
अंत_से	SEEK_END
शुरु_से	SEEK_SET
लघु_उच्च	SHRT_MAX
लघु_न्यून	SHRT_MIN
संक_पात	SIBGABRT
संक_भ_त्रुटि	SIGFPE
संक_अवैध	SIGILL
संक_विघ्न	SIGINT
संक_अंश	SIGSEGV
संक_इति	SIGTERM
संक_पूर्व	SIG_DFL
संक_त्रुटि	SIG_ERR
संक_छोड़ो	SIG_IGN
क्षणिक_उच्च	TMP_MAX
अच_अक्षर_उच्च	UCHAR_MAX
अच_पूर्णांक_उच्च	UINT_MAX

---

अच_दीर्घ_उच्च	ULONG_MAX
अच_लघु_उच्च	USHRT_MAX
__दिन__	__DATE__
__खाता__	__FILE__
__पंक्ति__	__LINE__
__मानक__	__STDC__
__समय__	__TIME__
_निकास	_exit
पात	abort
असल	abs
समय_ठीक	asctime
यंत्र	asm
निश्चित	assert
निकास_पर	atexit
म_से_भ	atof
म_से_प	atoi
म_से_द	atol
स्वतः	auto
अवरोध	break
द्रा_खोज	bsearch
सुस्मृति	calloc
हाल	case
उच्चमान	ceil
अक्षर	char
स_बदलो	chdir
साफ_त्रुटि	clearerr
घड़ी	clock
घड़ी_प्रकार	clock_t
बंद	close
बंद_सूची	closedir
स्थिर	const
जारी	continue
स_समय	ctime
शेष	default
स_अंतर	difftime
स_नाम	dirname
भाग	div
भाग_प्रकार	div_t
करो	do
द्विगुन	double
अन्यथा	else
क्रमगत	enum
त्रुटि_सं	errno
निकास	exit
बाह्य	extern
भ_असल	fabs
ख_बंद	fclose
ख_पूर्ण	feof



---

ख_त्रुटि	<b>ferror</b>
ख_साफ	<b>fflush</b>
ख_अक्षर_लो	<b>fgetc</b>
ख_स्थान_लो	<b>fgetpos</b>
ख_माला_लो	<b>fgets</b>
भग्न	<b>float</b>
न्यूनमान	<b>floor</b>
भ_शेष	<b>fmod</b>
ख_खोलो	<b>fopen</b>
क्रम	<b>for</b>
विभाजन	<b>fork</b>
ख_स्थान_प्रकार	<b>fpos_t</b>
ख_लिखो	<b>fprintf</b>
ख_अक्षर_दो	<b>fputc</b>
ख_माला_दो	<b>fputs</b>
ख_पढ़ो	<b>fread</b>
मुक्त	<b>free</b>
ख_व_खोलो	<b>freopen</b>
मित्र	<b>friend</b>
ख_पूछो	<b>fscanf</b>
ख_जाओ	<b>fseek</b>
ख_स्थान_दो	<b>fsetpos</b>
ख_स्थिति	<b>fstat</b>
ख_बताओ	<b>ftell</b>
ख_डालो	<b>fwrite</b>
अ_लो	<b>getc</b>
अक्षर_लो	<b>getchar</b>
दो_पर्या	<b>getenv</b>
माला_लो	<b>gets</b>
स_जमट	<b>gmtime</b>
जाओ	<b>goto</b>
अगर	<b>if</b>
अंतरभूत	<b>inline</b>
पूर्णांक	<b>int</b>
है_अक्षर_अंक	<b>isalnum</b>
है_अक्षर	<b>isalpha</b>
है_नियंत्रण	<b>iscntrl</b>
है_अंक	<b>isdigit</b>
है_सीमित	<b>isfinite</b>
है_चित्र	<b>isgraph</b>
है_छोटा	<b>islower</b>
है_अष्टक	<b>isodigit</b>
है_छाप	<b>isprint</b>
है_विराम	<b>ispunct</b>
है_खाली	<b>isspace</b>
है_बड़ा	<b>isupper</b>
है_षष्ठादशक	<b>isxdigit</b>
लॉघ_बफ	<b>jmp_buf</b>

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समाप्त	kill
द_असल	labs
स्था_बदल	lconv
द_भाग	ldiv
द_भाग_प्रकार	ldiv_t
क्षेत्र_बदलो	localeconv
स_स्थानीय	localtime
दीर्घ	long
दीर्घ_लॉघ	longjmp
दो_स्मृति	malloc
स_प्रथम	memchr
स_भेद	memcmp
स_नकल	memcpy
स_हटाओ	memmove
स_रखो	memset
सूची_गढ़ो	mkdir
स_गढ़ो	mktime
दुरत्व	offsetof
खोलो	open
सूची_खोलो	opendir
चालक	operator
छोड़ो	pause
लिखो_त्रुटि	perror
घात	pow
म_लिखो	printf
निजी	private
रक्षित	protected
सूचक_भेद_प्रकार	ptrdiff_t
खुला	public
अ_दो	putc
अक्षर_दो	putchar
माला_दो	puts
क्विक	qsort
उठाओ	raise
अक्रम	rand
पढ़ो	read
सूची_पढ़ो	readdir
पुनः_स्मृति	realloc
रेजिस्टर	register
हटाओ	remove
नाम	rename
वापस	return
शुरुआत	rewind
सूची_शुरु	rewinddir
सूची_हटाओ	rmdir
म_पूछो	scanf
रखो_बफ	setbuf
बनाओ_लॉघ	setjmp

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रखो_क्षेत्र	setlocale
रखो_भबफ	setvbuf
लघु	short
संक_पूर्ण_प्रकार	sig_atomic_t
संकेत	signal
चिन्हित	signed
संक_बाकी	sigpending
संक_रोको	sigsuspend
माप_प्रकार	size_t
माप	sizeof
प्र_लिखो	sprintf
वर्ग_मूल	sqrt
बेक्रम	srand
माला_पूछो	sscanf
अटल	static
मानक_त्रुटि	stderr
मानक_निवेश	stdin
मानक_निकास	stdout
म_जोड़ो	strcat
म_अक्षर	strchr
म_भेद	strcmp
म_नकल	strcpy
म_खोज	strcspn
म_त्रुटि	strerror
स_माला	strftime
म_माप	strlen
म_जोड़न	strncat
म_भेदन	strncmp
म_नकलन	strncpy
म_खोजप	strrchr
म_अखोज	strspn
म_माला	strstr
म_से_भग्न	strtod
म_मोहर	strtok
म_से_दीर्घ	strtol
म_से_अदीर्घ	strtoul
काष्ठा	struct
चयन	switch
प्रणाली	system
ढाँचा	template
समय	time
समय_प्रकार	time_t
बार	times
पंचांग	tm
क्षणिक_ख	tmpfile
क्षणिक	tmpnam
छोटे	tolower
बड़े	toupper

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प्रकार	<b>typedef</b>
अक्षर_वापस	<b>ungetc</b>
जोड़	<b>union</b>
अचिन्हित	<b>unsigned</b>
बहु_तर्क	<b>va_arg</b>
बहु_पूर्ण	<b>va_end</b>
बहु_सूची	<b>va_list</b>
बहु_शुरू	<b>va_start</b>
भख_लिखो	<b>vfprintf</b>
भव	<b>virtual</b>
व्योम	<b>void</b>
अस्थिर	<b>volatile</b>
भ_लिखो	<b>vprintf</b>
भम_लिखो	<b>vsprintf</b>
रुको	<b>wait</b>
ब_अक्षर_प्रकार	<b>wchar_t</b>
जबतक	<b>while</b>
ग_लिखो	<b>write</b>
समय_लो	<b>gettime</b>
समय_रखो	<b>settime</b>

### शैली श्रेणी शब्दकोष (Shaili Shraeni command reference)

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| | |
|------------|------------------|
| मुख्य | main |
| भाग.स | alloc.h |
| निश्चित.स | assert.h |
| मूलप्रण.स | bios.h |
| पट्टपन.स | conio.h |
| प्रकार.स | ctype.h |
| सूची.स | dir.h |
| डॉस.स | dos.h |
| त्रुटिसं.स | errno.h |
| भग्न.स | float.h |
| पन.स | io.h |
| सीमा.स | limits.h |
| क्षेत्र.स | locale.h |
| गणित.स | math.h |
| स्मृति.स | mem.h |
| क्रिया.स | process.h |
| समलौघ.स | setjmp.h |
| संकेत.स | signal.h |
| मानकतर्क.स | stdarg.h |
| मानकघोष.स | stddef.h |
| मानकपन.स | stdio.h |
| मानककोष.स | stdlib.h |

| | |
|---------------|---------------------|
| माला.स | string.h |
| स्थिति.स | stat.h |
| समय.स | time.h |
| ब_समय.स | timeb.h |
| अणु | { |
| पूर्ण | } |
| #घोषणा | #define |
| #या_अगर | #elif |
| #अन्यथा | #else |
| #पूर्ण_अगर | #endif |
| #त्रुटि | #error |
| #अगर | #if |
| #अगर_घोषित | #ifdef |
| #अगर_अघोषित | #ifndef |
| #समावेश | #include |
| #पंक्ति | #line |
| #आशय | #pragma |
| #अघोषित | #undef |
| बफ_मान | BUFSIZ |
| अक्षर_बिट | CHAR_BIT |
| अक्षर_उच्च | CHAR_MAX |
| अक्षर_न्यून | CHAR_MIN |
| शिशु_उच्च | CHILD_MAX |
| घड़ी_टिक | CLK_TCK |
| द्विग_भग्न | DBL_DIG |
| द्विग_अंतर | DBL_EPSILON |
| द्विग_पूर्ण | DBL_MANT_DIG |
| द्विग_उच्च | DBL_MAX |
| द्विग_न्यून | DBL_MIN |
| सूची | DIR |
| गलत_तर्क | EDOM |
| खातापूर्ण | EOF |
| दुस्फल | ERANGE |
| निकास_त्रुटि | EXIT_FAILURE |
| निकास_सफल | EXIT_SUCCESS |
| खाता | FILE |
| खातानाम_उच्च | FILENAME_MAX |
| भग्न_भग्न | FLT_DIG |
| भग्न_अंतर | FLT_EPSILON |
| भग्न_पूर्ण | FLT_MANT_DIG |
| भग्न_उच्च | FLT_MAX |
| भग्न_न्यून | FLT_MIN |
| भग्न_आधार | FLT_RADIX |
| ख_खोलो_उच्च | FOPEN_MAX |
| विशाल_मान | HUGE_VAL |
| अनन्त | INFINITY |
| पूर्णांक_उच्च | INT_MAX |

| | |
|------------------|---------------|
| पूर्णांक_न्यून | INT_MIN |
| द_द्वि_भग्न | LDBL_DIG |
| द_द्वि_अंतर | LDBL_EPSILON |
| द_द्वि_पूर्ण | LDBL_MANT_DIG |
| द_द्वि_उच्च | LDBL_MAX |
| द_द्वि_न्यून | LDBL_MIN |
| दीर्घ_उच्च | LONG_MAX |
| दीर्घ_न्यून | LONG_MIN |
| ब_क्षणिक | L_tmpnam |
| न_अंक | NAN |
| न_संशोधन | NDEBUG |
| शून्य | NULL |
| अक्रम_उच्च | RAND_MAX |
| च_अक्षर_उच्च | SCHAR_MAX |
| च_अक्षर_न्यून | SCHAR_MIN |
| प्रस्तुत_से | SEEK_CUR |
| अंत_से | SEEK_END |
| शुरु_से | SEEK_SET |
| लघु_उच्च | SHRT_MAX |
| लघु_न्यून | SHRT_MIN |
| संक_पात | SIBGABRT |
| संक_भ_त्रुटि | SIGFPE |
| संक_अवैध | SIGILL |
| संक_विघ्न | SIGINT |
| संक_अंश | SIGSEGV |
| संक_इति | SIGTERM |
| संक_पूर्व | SIG_DFL |
| संक_त्रुटि | SIG_ERR |
| संक_छेड़ो | SIG_IGN |
| क्षणिक_उच्च | TMP_MAX |
| अच_अक्षर_उच्च | UCHAR_MAX |
| अच_पूर्णांक_उच्च | UINT_MAX |
| अच_दीर्घ_उच्च | ULONG_MAX |
| अच_लघु_उच्च | USHRT_MAX |
| __दिन__ | __DATE__ |
| __खाता__ | __FILE__ |
| __पंक्ति__ | __LINE__ |
| __मानक__ | __STDC__ |
| __समय__ | __TIME__ |
| _निकास | _exit |
| पात | abort |
| असल | abs |
| समय_ठीक | asctime |
| यंत्र | asm |
| निश्चित | assert |
| निकास_पर | atexit |
| म_से_भ | atof |
| म_से_प | atoi |

| | |
|----------------|----------|
| म_से_द | atol |
| स्वतः | auto |
| अवरोध | break |
| द्रा_खोज | bsearch |
| सुस्मृति | calloc |
| हाल | case |
| पकड़ो | catch |
| उच्चमान | ceil |
| अक्षर | char |
| स_बदलो | chdir |
| श्रेणी | class |
| साफ_त्रुटि | clearerr |
| घड़ी | clock |
| घड़ी_प्रकार | clock_t |
| बंद | close |
| बंद_सूची | closedir |
| स्थिर | const |
| जारी | continue |
| स_समय | ctime |
| शेष | default |
| मिटोओ | delete |
| स_अंतर | difftime |
| स_नाम | dirname |
| भाग | div |
| भाग_प्रकार | div_t |
| करो | do |
| द्विगुन | double |
| अन्यथा | else |
| क्रमगत | enum |
| त्रुटि_सं | errno |
| निकास | exit |
| बाह्य | extern |
| भ_असल | fabs |
| ख_बंद | fclose |
| ख_पूर्ण | feof |
| ख_त्रुटि | ferror |
| ख_साफ | fflush |
| ख_अक्षर_लो | fgetc |
| ख_स्थान_लो | fgetpos |
| ख_माला_लो | fgets |
| भग्न | float |
| न्यूनमान | floor |
| भ_शेष | fmod |
| ख_खोलो | fopen |
| क्रम | for |
| विभाजन | fork |
| ख_स्थान_प्रकार | fpos_t |
| ख_लिखो | fprintf |

| | |
|--------------|-------------------|
| ख_अक्षर_दो | fputc |
| ख_माला_दो | fputs |
| ख_पढ़ो | fread |
| मुक्त | free |
| ख_व_खोलो | freopen |
| मित्र | friend |
| ख_पूछो | fscanf |
| ख_जाओ | fseek |
| ख_स्थान_दो | fsetpos |
| ख_स्थिति | fstat |
| ख_बताओ | ftell |
| ख_डालो | fwrite |
| अ_लो | getc |
| अक्षर_लो | getchar |
| दो_पर्या | getenv |
| माला_लो | gets |
| स_जमट | gmtime |
| जाओ | goto |
| अगर | if |
| अंतरभूत | inline |
| पूर्णक | int |
| है_अक्षर_अंक | isalnum |
| है_अक्षर | isalpha |
| है_नियंत्रण | iscntrl |
| है_अंक | isdigit |
| है_सीमित | isfinite |
| है_चित्र | isgraph |
| है_छोटा | islower |
| है_अष्टक | isodigit |
| है_छाप | isprint |
| है_विराम | ispunct |
| है_खाली | isspace |
| है_बड़ा | isupper |
| है_षष्ठादशक | isxdigit |
| लॉघ_बफ | jmp_buf |
| समाप्त | kill |
| द_असल | labs |
| स्था_बदल | lconv |
| द_भाग | ldiv |
| द_भाग_प्रकार | ldiv_t |
| क्षेत्र_बदलो | localeconv |
| स_स्थानीय | localtime |
| दीर्घ | long |
| दीर्घ_लॉघ | longjmp |
| दो_स्मृति | malloc |
| स_प्रथम | memchr |
| स_भेद | memcmp |
| स_नकल | memcpy |

| | |
|------------------|--------------|
| स_हटाओ | memmove |
| स_रखो | memset |
| सूची_गढ़ो | mkdir |
| स_गढ़ो | mktime |
| नया | new |
| दुरत्व | offsetof |
| खोलो | open |
| सूची_खोलो | opendir |
| चालक | operator |
| छोड़ो | pause |
| लिखो_त्रुटि | perror |
| घात | pow |
| म_लिखो | printf |
| निजी | private |
| रक्षित | protected |
| सूचक_भेद_प्रकार | ptrdiff_t |
| खुला | public |
| अ_दो | putc |
| अक्षर_दो | putchar |
| माला_दो | puts |
| क्विक | qsort |
| उठाओ | raise |
| अक्रम | rand |
| पढ़ो | read |
| सूची_पढ़ो | readdir |
| पुनः_स्मृति | realloc |
| रेजिस्टर | register |
| हटाओ | remove |
| नाम | rename |
| वापस | return |
| शुरुआत | rewind |
| सूची_शुरु | rewinddir |
| सूची_हटाओ | rmdir |
| म_पूछो | scanf |
| रखो_बफ | setbuf |
| बनाओ_लॉघ | setjmp |
| रखो_क्षेत्र | setlocale |
| रखो_भबफ | setvbuf |
| लघु | short |
| संक_पूर्ण_प्रकार | sig_atomic_t |
| संकेत | signal |
| चिह्नित | signed |
| संक_बाकी | sigpending |
| संक_रोको | sigsuspend |
| माप_प्रकार | size_t |
| माप | sizeof |
| प्र_लिखो | sprintf |
| वर्ग_मूल | sqrt |

| | |
|-------------|----------------------|
| बेक्रम | srand |
| माला_पूछो | sscanf |
| अटल | static |
| मानक_त्रुटि | stderr |
| मानक_निवेश | stdin |
| मानक_निकास | stdout |
| म_जोड़ो | strcat |
| म_अक्षर | strchr |
| म_भेद | strcmp |
| म_नकल | strcpy |
| म_खोज | strcspn |
| म_त्रुटि | strerror |
| स_माला | strftime |
| म_माप | strlen |
| म_जोड़न | strncat |
| म_भेदन | strncmp |
| म_नकलन | strncpy |
| म_खोजप | strrchr |
| म_अखोज | strspn |
| म_माला | strstr |
| म_से_भग्न | strtod |
| म_मोहर | strtok |
| म_से_दीर्घ | strtol |
| म_से_अदीर्घ | strtoul |
| काष्ठा | struct |
| चयन | switch |
| प्रणाली | system |
| ढाँचा | template |
| यह | this |
| फेंको | throw |
| समय | time |
| समय_प्रकार | time_t |
| बार | times |
| पंचांग | tm |
| क्षणिक_ख | tmpfile |
| क्षणिक | tmpnam |
| छोटे | tolower |
| बड़े | toupper |
| प्रयास | try |
| प्रकार | typedef |
| अक्षर_वापस | ungetc |
| जोड़ | union |
| अचिन्हित | unsigned |
| बहु_तर्क | va_arg |
| बहु_पूर्ण | va_end |
| बहु_सूची | va_list /*बहु तर्क*/ |
| बहु_शुरु | va_start |
| भख_लिखो | vfprintf |

| | |
|----------------|----------------------|
| भव | virtual |
| व्योम | void |
| अस्थिर | volatile |
| भ_लिखो | vprintf |
| भम_लिखो | vsprintf |
| रुको | wait |
| ब_अक्षर_प्रकार | wchar_t |
| जबतक | while |
| ग_लिखो | write |
| | |
| पनप्रवाह.स | iostream.h |
| पनप्रवाह_स | iostream |
| पन_प्रवाह | iostream |
| अ_बाहर | cout |
| अ_अंदर | cin |
| डेसी | dec |
| षष्ठ | hex |
| अष्ट | oct |
| खाली | ws |
| प_पूर्ण | endl |
| म_पूर्ण | ends |
| सफाई | flush |
| पुनः_पन_झंडे | resetiosflags |
| रखो_आधार | setbase |
| रखो_भरो | setfill |
| रखो_पन_झंडे | setiosflags |
| रखो_सटीक | setprecision |
| रखो_चौड़ाई | setw |
| पनप | ios |
| छोड़ो_खाली | skipws |
| बाँए | left |
| दाँए | right |
| वैज्ञानिक | scientific |
| जड़ | fixed |
| बड़ा | uppercase |
| लिखो_आधार | showbase |
| लिखो_बिंदु | showpoint |
| लिखो_चिन्ह | showpos |
| ब_प्रवाह | ostream |
| अ_प्रवाह | istream |
| खप्रवाह.स | fstream.h |
| ख_प्रवाह | fstream |
| अख_प्रवाह | ifstream |
| म_लो | ins |
| नत्थी | app |
| अंत_पर | ate |
| न_नया | nocreate |
| न_प्रति | noreplace |

| | |
|-----------|-------------|
| छाँटो | trunc |
| बख_प्रवाह | ofstream |
| म_दो | outs |
| अ_त्रुटि | cerr |
| लो | get |
| दो | put |
| ग_स्थान | seekg |
| हार | fail |
| खप | eof |
| सफा | clear |
| बुरा | bad |
| अच्छा | good |
| मप्रवाह.स | strstream.h |
| मप्रवाह_स | sstream |
| म_प्रवाह | strstream |
| बम_प्रवाह | ostrstream |
| अम_प्रवाह | istrstream |
| लो_पंक्ति | getline |
| द्विग | binary |
| प_स्थान | seekp |
| मानकपन | stdio |
| समय_लो | gettime |
| समय_रखो | settime |

शैली शब्द शब्दकोष (Shaili Shabda command reference)

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श_शब्द	yylex
श_ब_मान	yylval
श_माला	yytext
श_पंक्ति	yylineno

### शैली व्याकरण शब्दकोष (Shaili Wyaakaran command reference)

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| | |
|--------------|----------|
| श_शब्द | yylex |
| श_ब_मान | yylval |
| श_माला | yytext |
| श_पंक्ति | yylineno |
| व्याक | yyparse |
| व्याक_त्रुटि | yyerror |

| | |
|-------|--------|
| %मोहर | %token |
| %बाँए | %left |
| %दाँए | %right |

| | |
|------------------|-----------|
| %बेमेल | %nonassoc |
| %प्राथमिकता | %prec |
| %जोड़ | %union |
| %पूरक | %term |
| %प्रकार | %type |
| %समप्रवाह | %synch |
| %शुरु | %xstart |
| व्याक_ढेर_प्रकार | YYSTYPE |

शैली यांत्रिक शब्दकोष (Shaili Yaantrik command reference)

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नोट: अगर निम्नलिखित प्रकार से किसी आदेश के सम्मुख खड़ी रेखा (|) हो, तो इसका अर्थ है कि वह आदेश परवर्ती आदेश का समानार्थक है। उदाहरणतः, आधार\_सूचक तथा आस समानार्थक हैं।

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उदाहरण:

| | | |
|-----------|--|----|
| आधार_सूचक | | |
| आस | | BP |

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कउ	AH
कन	AL
कक्ष	AX
खउ	BH
खन	BL
खक्ष	BX
गउ	CH
गन	CL
गक्ष	CX
घउ	DH
घन	DL
घक्ष	DX
बकक्ष	EAX
बखक्ष	EBX
बगक्ष	ECX
बघक्ष	EDX
बआस	EBP
बनस	EIP
बतक	EDI
बढक	ESI
आधार_सूचक	
आस	BP
निर्देश_सूचक	
नस	IP

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ढेर_सूचक	
ढस	SP
कूट_खंड	
कख	CS
तथ्य_खंड	
तख	DS
बृहत_खंड	
बरख	ES
दूर_खंड	
दख	FS
ग_खंड	
गख	GS
ढेर_खंड	
ढख	SS
तथ्य_सूचकांक	
तक	DI
ढेर_सूचकांक	
ढक	SI

## /\*OPERATORS\*/

और	AND
बाइट	BYTE
टिप्पणी	COMMENT
बराबर	
बर	EQ
दूर	FAR
जब	GE
ज्यादा	
जय	GT
उच्च	HIGH
कम_बराबर	
कब	LE
नाप	LENGTH
पंक्ति	LINE
न्यून	LOW
कम	LT
नकाब	MASK
शेष	MOD
नब	NE
निकट	NEAR
नहीं	NOT
कुछ_नहीं	NOTHING
दुरत्व	OFFSET
या	OR
सूचक	PTR
खंड	SEG
लघु	SHORT

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माप	SIZE
ढेर	STACK
यह	THIS
प्रकार	TYPE
जबतक	WHILE
चौड़ाई	WIDTH
शब्द	WORD
अथवा	XOR

### **/\*dIrectives\*/**

मिलाओ	ALIGN
.सजाओ	.ALPHA
मानो	ASSUME
.कूट	.CODE
साधारण	COMM
.स्थिर	.CONST
.संदर्भ	.CREF
.तथ्य	.DATA
.तथ्य?	.DATA?
तथ्य_बाइट	BYTE
तब	DB
तथ्य_द्विगुन	DWORD
तद	DD
तदूर	DF
तथ्य_दूर	FWORD
डॉसखंड	DOSSEG
तथ्य_चौथ	QWORD
तच	DQ
दब	DT
दस_बाइट	TWORD
तथ्य_शब्द	
तश	DW
अन्था	ELSE
पूर्ण	END
पूर्ण_अगर	ENDIF
पूर्ण_सक्रिया	ENDM
पूर्ण_क्रिया	ENDP
पूर्ण_खंड	ENDS
सम	EQU
.त्रुटि	.ERR
.त्रुटि1	.ERR1
.त्रुटि2	.ERR2
.त्रुटि_सत	.ERRE
.त्रुटि_असत	.ERRNZ
.त्रुटि_घोषित	.ERRDEF
.त्रुटि_अघोषित	.ERRNDEF
.त्रुटि_खाली	.ERRB

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.त्रुटि_न_खाली	.ERRNB
.त्रुटि_सम_माला	.ERRIDN
.त्रुटि_असम_माला	.ERRDIF
जोड़_मिल	EVEN
.निकास	.EXIT
निकासक	EXITM
बाह्य	EXTRN
.दूरतथ्य	.FARDATA
.दूरतथ्य?	.FARDATA?
समूह	GROUP
अगर	IF
अगर1	IF1
अगर2	IF2
अगर_खाली	IFB
अगर_घोषित	IFDEF
अगर_असम	IFDIF
अगर_असत	IFE
अगर_सम	IFIDN
अगर_भरा	IFNB
अगर_अघोषित	IFNDEF
समावेश	INCLUDE
समावेश_कोष	INCLUDELIB
समाकोष	INCLUDELIB
क्रम	IRP
क्रमअ	IRPC
मोहर	LABEL
.दिखाओ	.LIST
स्थानीय	LOCAL
.स्वरूप	.MODEL
सक्रिया	MACRO
नाम	NAME
शुरू	ORG
%लिखो	%OUT
पृष्ठ	PAGE
क्रिया	PROC
सार्व	PUBLIC
सीमित	PURGE
.आधार	.RADIX
अभिलेख	RECORD
दोहराओ	REPT
.मत_यंत्र	.SALL
अखंड	SEGMENT
.मूल	.SEQ
.ढेर	.STACK
ढाँचा	STRUC
उपशीर्षक	SUBTTL
शीर्षक	TITLE
जोड़	UNION



.मत_कोई	.XALL
.असंदर्भ	.XCREF
.मत_दिखाओ	.XLIST
प्रथम	ENTRY
विधि	FORMAT
प्रयोग	EXECUTABLE
पाठक	READABLE
लेखक	WRITEABLE

## /\*instruction\*/

जोड़_ठीक	AAA	
जठ	AAA	
भाग_ठीक	AAD	
भाठ	AAD	
गुणा_ठीक		
गठ	AAM	
घटा_ठीक		
घठ	AAS	
जोड़_ढोओ		
जढ	ADC	
जमा		ADD
छूट_स्तर_ठीक		
छसठ	ARPL	
सीमा		BOUND
आगे_बिट		
अब	BSF	
पीछे_बिट		
पब	BSR	
बिट_जाँच		
बिटज	BT	
बिट_जाँच_विपरीत		
बजविप	BTC	
बिट_जाँच_पुनः		
बजप	BTR	
बिट_जाँच_वापस		
बजव	BTS	
आरम्भ		CALL
बाइट_से_शब्द		
बसश	CBW	
दो_से_चार		
दसच	CDQ	
साफ_ढोओ_झंडा		
सढझ	CLC	
साफ_दिशा_झंडा		
सदझ	CLD	
विघ्न_बंद		
वब	CLI	

साफ_क्रिया_बदल		
सकब	<b>CLTS</b>	
विपरीत_ढोओ		
वढ	<b>CMC</b>	
भेद		<b>CMP</b>
भेद_माला_बाइट		
भमाब	<b>CMPSB</b>	
भेद_माला_शब्द		
भमाश	<b>CMPSW</b>	
भेद_बदल		<b>CMPXCHG</b>
भेद_बदल_8ब		<b>CMPXCHG8B</b>
शब्द_से_द्विगुन		
शसद	<b>CWD</b>	
दसम_जोड़_ठीक		
दजठ	<b>DAA</b>	
दसम_घटा_ठीक		
दघठ	<b>DAS</b>	
नफा		<b>DEC</b>
भाग		<b>DIV</b>
प्रवेश		<b>ENTER</b>
रुको		<b>HLT</b>
पूर्ण_भाग		
पभ	<b>IDIV</b>	
पूर्ण_गुणा		
पग	<b>IMUL</b>	
अंदर		<b>IN</b>
लाभ		<b>INC</b>
अंदर_माला_बाइट		
अमब	<b>INSB</b>	
अंदर_माला_शब्द		
अमश	<b>INSW</b>	
विघ्न		<b>INT</b>
विघ्न3		<b>INT3</b>
विघ्न_अति		
विघ्नअ	<b>INTO</b>	
विघ्न_वापस		
ववाप	<b>IRET</b>	
लॉघ_ऊपर		
लऊ	<b>JA</b>	
लॉघ_ऊपर_बराबर		
लऊब	<b>JAE</b>	
लॉघ_नीचे		
लन	<b>JB</b>	
लॉघ_नीचे_बराबर		
लनीब	<b>JBE</b>	
लॉघ_गक्ष_श		
लगश	<b>JCXZ</b>	
लॉघो_बराबर		

लब	<b>JE</b>	
लॉघ_बगक्ष_श		
लबगश	<b>JECXZ</b>	
लॉघो_ज्यादा		
लज	<b>JG</b>	
लॉघो_ज्यादा_बराबर		
लजब	<b>JGE</b>	
लॉघो_कम		
लक	<b>JL</b>	
लॉघो_कम_बराबर		
लकब	<b>JLE</b>	
लॉघो		
लॉघ	<b>JMP</b>	
लॉघ_न_ऊपर		
लनऊ	<b>JNA</b>	
लॉघ_न_ऊ_ब		
लनऊब	<b>JNAE</b>	
लॉघ_न_न		
लनन	<b>JNB</b>	
लॉघ_न_न_ब		
लननब	<b>JNBE</b>	
लॉघो_नहीं_बराबर		
लनब	<b>JNE</b>	
लॉघो_नहीं_ज्यादा		
लनज	<b>JNG</b>	
लॉघो_नहीं_ज्यादा_बराबर		
लनजब	<b>JNGE</b>	
लॉघ_न_कम		
लनक	<b>JNL</b>	
लॉघ_न_क_ब		
लनकब	<b>JNLE</b>	
लॉघ_न_अति		
लनअ	<b>JNO</b>	
लॉघ_न_मेल		
लनम	<b>JNP</b>	
लॉघ_न_चिन्ह		
लनच	<b>JNS</b>	
लॉघो_नहीं_शून्य		
लनश	<b>JNZ</b>	
लॉघ_अति		
लअ	<b>JO</b>	
लॉघ_मेल		
लम	<b>JP</b>	
लॉघ_म_ब		
लमब	<b>JPE</b>	
लॉघ_म_अ		
लमअ	<b>JPO</b>	
लॉघ_च		

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लच	JS	
लाँघो_शून्य		
लश	JZ	
भरो_कउ_झंडा		
भकझ	LAHF	
भरो_अनुमति		
भअ	LAR	
भरो_तख		
भतख	LDS	
भरो_ठिकाना		
भठ	LEA	
निकलो		LEAVE
भरो_बख		
भबख	LES	
भदख		LFS
भरो_व्याख्या		
भव्या	LGDT	
भगख		LGS
भरो_विघ्न		
भविघ्न	LIDT	
भरो_स्थानीय		
भस्था	LLDT	
भरो_यंत्र_अवस्था		
भयअ	LMSW	
ताला		LOCK
भरो_माला_ब		
भमब	LODSB	
भरो_माला_शब्द		
भमश	LODSW	
फिर		LOOP
फिर_बराबर		
फिरबर	LOOPE	
फिर_न_बराबर		
फिरनब	LOOPNE	
फिर_न_श		
फिरनश	LOOPNZ	
फिर_श		
फिरश	LOOPZ	
भरो_खंड_सीमा		
भखस	LSL	
भरो_ढेर_खंड		
भढख	LSS	
भरो_क्रिया_रेज		
भखर	LTR	
डालो		MOV
डालो_माला_ब		
डालोमब	MOVSB	
डालो_माला_श		

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डालोमश **MOVSW**  
 डालो\_चिन्ह\_अति |  
 डचअ **MOVSB**  
 डालो\_शून्य\_अति |  
 डशअ **MOVZX**  
 गुणा **MUL**  
 नकार **NEG**  
 व्यर्थ\_क्रिया |  
 वक्रि **NOP**  
 बाहर **OUT**  
 बाहर\_माला\_ब |  
 बमब **OUTSB**  
 बाहर\_माला\_श |  
 बमश **OUTSW**  
 लो **POP**  
 लो\_सब |  
 लोस **POPA**  
 लो\_द्वि |  
 लोसद **POPAD**  
 लो\_झंडे |  
 लोझ **POPF**  
 लो\_झंडे\_द्वि |  
 लोझद **POPFD**  
 दो **PUSH**  
 दो\_सब |  
 दोस **PUSHA**  
 दो\_सब\_द्वि |  
 दोसद **PUSHAD**  
 दो\_झंडे |  
 दोझ **PUSHF**  
 दो\_झंडे\_द्वि |  
 दोझद **PUSHFD**  
 घुमाओ\_ढेओ\_बाँए |  
 घढब **RCL**  
 घुमाओ\_ढेओ\_दाँए |  
 घढद **RCR**  
 पुनः **REP**  
 पुनः\_बराबर |  
 पुनःब **REPE**  
 पुनः\_न\_बराबर |  
 पुनःनब **REPNE**  
 पुनः\_न\_शून्य |  
 पुनःनश **REPNZ**  
 पुनः\_शून्य |  
 पुनःश **REPZ**  
 वापस **RET**  
 वापस\_दूर |  
 वापद **RETF**

घुमाओ\_बाँए |  
 घब **ROL**  
 घुमाओ\_दाँए |  
 घद **ROR**  
 रखो\_कउ\_झंडा |  
 रकझ **SAHF**  
 हटाओ\_गणित\_बाँए |  
 हगब **SAL**  
 हटाओ\_गणित\_दाँए |  
 हगद **SAR**  
 हटाओ\_बाँए |  
 हब **SHL**  
 हटाओ\_दाँए |  
 हद **SHR**  
 हटाओ\_बाँए\_द्वि |  
 हबद **SHLD**  
 हटाओ\_दाँए\_द्वि |  
 हदद **SHRD**  
 घटा\_उधार |  
 घउध **SBB**  
 पढो\_माला\_ब |  
 पमब **SCASB**  
 पढो\_माला\_श |  
 पमश **SCASW**  
 रखो\_ऊपर |  
 रऊ **SETA**  
 रखो\_ऊपर\_बराबर |  
 रऊब **SETAE**  
 रखो\_नीचे |  
 रन **SETB**  
 रखो\_नीचे\_बराबर |  
 रनब **SETBE**  
 रखो\_बराबर |  
 रब **SETE**  
 रखो\_ज्यादा |  
 रज **SETG**  
 रखो\_ज्यादा\_बराबर |  
 रजब **SETGE**  
 रखो\_कम |  
 रक **SETL**  
 रखो\_कम\_बराबर |  
 रकब **SETLE**  
 रखो\_न\_ऊपर |  
 रनऊ **SETNA**  
 रखो\_न\_ऊ\_ब |  
 रनऊब **SETNAE**  
 रखो\_न\_न |  
 रनन **SETNB**

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रखो\_न\_न\_ब |  
 रननब SETNBE  
 रखो\_नहीं\_बराबर |  
 रनाब SETNE  
 रखो\_नहीं\_ज्यादा |  
 रनज SETNG  
 रखो\_नहीं\_ज्यादा\_बराबर SETNGE  
 रनजब SETNGE  
 रखो\_न\_कम SETNL  
 रनक SETNL  
 रखो\_न\_क\_ब SETNLE  
 रनकब SETNLE  
 रखो\_न\_अति SETNO  
 रनअ SETNO  
 रखो\_न\_मेल SETNP  
 रनम SETNP  
 रखो\_न\_चिन्ह SETNS  
 रनच SETNS  
 रखो\_नहीं\_शून्य SETNZ  
 रनश SETNZ  
 रखो\_अति SETO  
 रअ SETO  
 रखो\_मेल SETP  
 रम SETP  
 रखो\_म\_ब SETPE  
 रमब SETPE  
 रखो\_म\_अ SETPO  
 रमअ SETPO  
 रखो\_च SETS  
 रच SETS  
 रखो\_शून्य SETZ  
 रश SETZ  
 रखो\_व्याख्या SGDT  
 रखो\_विघ्न SIDT  
 रखो\_स्थानीय SLDT  
 रखो\_यंत्र\_अवस्था SMSW  
 रयअ SMSW  
 रखो\_ढोओ\_झंडा STC  
 रदझ STC  
 रखो\_दिशा\_झंडा STD  
 रदझ STD  
 विघ्न\_शुरू STI  
 वश STI  
 रखो\_माला\_ब STOSB  
 रखमब STOSB  
 रखो\_माला\_श STOSW  
 रखमश STOSW  
 रखो\_क्रिया\_रेज STR

रक्रिर	STR	
घटा		SUB
जॉच		TEST
सटीक_लिखो	VERR	
सल	VERR	
सटीक_पढ़ो	VERRW	
सप	VERRW	
विलंब		WAIT
बदलो_जोड़ो	XADD	
बज	XADD	
बदलो		XCHG
अनुवाद	XLAT	
अनु	XLAT	
ढाँचा_क्षुद्र		TINY
ढाँचा_छोटा		SMALL
ढाँचा_कठोर		COMPACT
ढाँचा_बड़ा		LARGE
ढाँचा_बृहत		HUGE

## शैली कृत्रिम शब्दकोष (Shaili Kritrim command reference)

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| | |
|----------|----------|
| अणु | { |
| पूर्ण | } |
| टिप | // |
| मुख्य | main |
| सार | abstract |
| द्राफल | boolean |
| अवरोध | break |
| बाईट | byte |
| हाल | case |
| पकड़ो | catch |
| अक्षर | char |
| श्रेणी | class |
| स्थिर | const |
| जारी | continue |
| शेष | default |
| करो | do |
| द्विगुन | double |
| अन्यथा | else |
| पूर्वज | extends |
| अन्तिम | final |
| अन्तिमतः | finally |
| भग्न | float |
| क्रम | for |

| | |
|-----------|---------------------|
| जाओ | goto |
| अगर | if |
| लागु | implements |
| आयात | import |
| अवतार | instanceof |
| पूर्णक | int |
| स्वरूप | interface |
| दीर्घ | long |
| यांत्रिक | native |
| नया | new |
| कोष | package |
| निजी | private |
| रक्षित | protected |
| खुला | public |
| वापस | return |
| लघु | short |
| जड़ | static |
| दृढ़भग्न | strictfp |
| मह | super |
| चयन | switch |
| समप्रवाह | synchronised |
| यह | this |
| फेंको | throw |
| फेंकता_है | throws |
| अस्थायी | transient |
| प्रयास | try |
| व्योम | void |
| अस्थिर | volatile |
| जबतक | while |

| | |
|---------------------------|---------------------------------------|
| प्रयोग_श्रेणी | Applet |
| प्रयोग | applet |
| तर्क | args |
| गणित_त्रुटि | ArithmeticException |
| व्यूह_सूचकांक_खेद_त्रुटि | ArrayIndexOutOfBoundsException |
| व्यूह_स्थिति_त्रुटि | ArrayStateException |
| ध्वनि_अंश | AudioClip |
| औसंख | awt /* औजार संक्षिप्त खिड़की*/ |
| बफर_पाठक | BufferedReader |
| अक्षर_स्थान | charAt |
| श्रेणी_साँचा_त्रुटि | ClassCastException |
| श्रेणी_उपलब्ध_नहीं_त्रुटि | ClassNotFoundException |
| श्रेणी_निराधार_त्रुटि | ClassNotSupportedException |
| नकल | clone |
| बंद | close |
| भेद | compareTo |
| संयोग | concat |
| यह_कड़ी | currentThread |

| | |
|-------------------------|------------------------------|
| दिन | Date |
| मिटाने | destroy |
| माला_लिखो | drawString |
| अंत_में | endsWith |
| बराबर | equals |
| बराबर_न | equalsIgnoreCase |
| खाता_प्रवेश_प्रवाह | FileInputStream |
| खाता_निकास_प्रवाह | FileOutputStream |
| भरो_ढेर | fillInStackTrace |
| अंतिम | finalize |
| लो_ध्वनि_अंश | getAudioClip |
| लो_बाइट | getBytes |
| लो_अक्षर | getChars |
| लो_श्रेणी | getClass |
| लो_अंश_माप | getLength |
| लो_अंश_प्रकार | getContentType |
| लो_दिन | getDate |
| लो_अन्त | getExpiration |
| लो_क्षेत्र_सूचकांक | GetFieldID |
| लो_छवि | getImage |
| लो_प्रवेश_प्रवाह | getInputStream |
| लो_पूर्ण_क्षेत्र | GetIntField |
| लो_पूर्व_बदली | getLastModified |
| लो_स्थानीय_संदेश | getLocalizedMessage |
| लो_संकेत | getMessage |
| लो_नाम | getName |
| लो_वस्तु_श्रेणी | GetObjectClass |
| लो_तर्क | getParameter |
| लो_प्राथमिक | getPriority |
| चित्रांकन | Graphics |
| हैश_कूट | hashCode |
| अवैध_प्रवेश_त्रुटि | IllegalAccessException |
| अवैध_तर्क_त्रुटि | IllegalArgumentException |
| अवैध_योजक_त्रुटि | IllegalMonitorStateException |
| अवैध_स्थिति_त्रुटि | IllegalStateException |
| अवैध_कड़ी_स्थिति_त्रुटि | IllegalThreadStateException |
| छवि | Image |
| सूचकांक | indexOf |
| सूचकांक_भेद_त्रुटि | IndexOutOfBoundsException |
| उपसर्ग | init |
| प्रवेश_प्रवाह | InputStream |
| प्रवेश_प्रवाह_पाठक | InputStreamReader |
| अवतारण_त्रुटि | InstantiationException |
| विघ्न_त्रुटि | InterruptedException |
| पन | io |
| जीवित_है | isAlive |
| कृत्रिम | java |
| मेल | join |

| | |
|-----------------------------|--|
| पूर्व_सूचकांक | lastIndexOf |
| माप | length |
| लो_कोष | loadLibrary |
| दोहराओ | loop |
| गणित | Math |
| उच्च_प्राथमिकता | MAX_PRIORITY |
| न्यून_प्राथमिकता | MIN_PRIORITY |
| ऋण_व्यूह_माप_त्रुटि | NegativeArraySizeException |
| नेट | net |
| अगला_द्वि | nextdouble |
| सामान्य_प्राथमिकता | NORM_PRIORITY |
| कोई_ऐसा_क्षेत्र_नहीं_त्रुटि | NoSuchFieldException |
| कोई_ऐसी_क्रिया_नहीं_त्रुटि | NoSuchMethodException |
| संकेत | notify |
| संकेत_सब | notifyAll |
| शून्य_सूचक_त्रुटि | NullPointerException |
| अंक_रचना-त्रुटि | NumberFormatException |
| वस्तु | Object |
| खोलो_सम्बन्ध | openConnection |
| बाहर | out |
| निकास_प्रवाह | OutputStream |
| बनाओ | paint |
| बजाओ | play |
| म_लिखो_न | println |
| दिखाओ_ढेर | printStackTrace |
| छापाकार | PrintWriter |
| अक्रम | rand |
| म_पढ़ो | read |
| पाठक | Reader |
| पंक्ति_पढ़ो | readLine |
| क्षेत्र_मेल | regionMatches |
| प्रतिस्थापन | replace |
| पुनः_आरम्भ | resume |
| आरम्भ | run |
| आरम्भ_लायक | Runnable |
| सुरक्षा_त्रुटि | SecurityException |
| रखो_पूर्ण_क्षेत्र | SetIntField |
| रखो_नाम | setName |
| रखो_प्राथमिकता | setPriority |
| सो_जाओ | sleep |
| वर्ग_मूल | sqrt |
| शुरू | start |
| शुरू_में | startsWith |
| विराम | stop |
| माला_श्रेणी | String |
| माला_बफर | StringBuffer |
| माला_सूचकांक_सीमा_खेद | StringIndexOutOfBoundsException |
| उपमाला | substring |

| | |
|---------------------------|-------------------------------|
| स्थगित | suspend |
| प्रणाली | System |
| कड़ी | Thread |
| फेंकने_लायक | Throwable |
| करो_अक्षर_व्यूह | toCharArray |
| करो_छोटे | toLowerCase |
| करो_माला | toString |
| करो_बड़े | toUpperCase |
| छाँटो | trim |
| क्रिया_उपलब्ध_नहीं_त्रुटि | UnsupportedOperationException |
| नया_हाल | update |
| वसंज्ञ | URL /* व्यापक स्रोत ज्ञातक */ |
| वसंज्ञ_सम्बन्ध | URLConnection |
| उपयोग | util |
| मान | valueOf |
| रुको | wait |
| म_लिखो | write |
| लेखक | Writer |

Technical Description

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(Ref. Choudhary Abhishek, Karwa Sweta. "Hindawi - A Software Development System for North Indian Vernaculars", Presented at CSI YITPA (East) 2004, Science City, Kolkata)

## Introduction and objectives of the project

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The promises of India becoming an IT superpower in the near future shall bear fruit only if it takes into account the majority of the populace which has not been privileged enough to have mastered English, which in turn hinders them from participating in the larger picture of Information and Communication Technologies (ICT) owing to the lack of software development systems based on the vernaculars. This paper presents the design and development of Hindawi - a complete software development (programming) system for the North Indian vernaculars and answers many "key" technological issues that hinder the development of such a system.

The authors have dealt with the issue at all levels of systems design, having successfully developed technologies for console representation of North Indian scripts in "text-mode" without the need for any extra hardware and a method for compilation of ISCII based source code. The complete glyphs for

the North Indian scripts have been successfully incorporated into extended ASCII code pages while maintaining the 7-bit ASCII unaltered. The representation also allows easy integration into UNICODE. The compilation of ISCII based source code has been achieved through the design of a non-ambiguous invertible case and diacritic independent transliteration system compatible with most compiler systems.

The use of GNU GCC as the back end has ensured high portability across a heterogeneous range of platforms. The authors have successfully developed programming languages based on most prevalent paradigms including imperative, OOP, functional, and logic among others; leading to the development of the equivalents of at least Assembly, BASIC, C, C++, FORTRAN, Pascal, LISP, Prolog, lex, and yacc in North Indian vernaculars, in languages using the Assomiya, Bangla, Devnagri and Gujrati scripts, with the Oriya and Gurmukhi scripts under development. This has made possible the porting of the LINUX kernel sources to the Hindawi programming system. A port to FreeDOS is also being developed. The authors' expertise in robotics has allowed them to apply Hindawi to robotics systems design. The system promises to be able to support South Indian languages soon.

The authors have made the complete system, including the design of a North Indian vernacular understanding robot, "Open Source" in keeping with the primary objective of providing India's "vernacular literate" a voice in the race towards making India an IT superpower.

Contributions of the project

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The plethora of software being developed for the Indian vernaculars is generally focussed towards the application domain with very little or no emphasis on Indian languages system-software, with the exception of a few "shell wrappers". This has lead to the situation where the majority of the populace do have an opportunity to become consumers of the products of the ICT revolution, but cannot become contributors to it, in any significant manner. The reason for this may be traced to a few technological bottlenecks, most of which have been answered during

the course of this project.

The primary bottleneck has been that of compilation of Indian script source code, as there is no systems level support for the same. The ISCII puts the Indian codes in the extended half of the 8-bit code pages, which are not supported by most compiler systems. A solution to this is the use of a transliteration layer between the source and the language processor, however existing transliteration systems produce output incompatible with the input set of the processors, which in most cases introduces ambiguity upon inversion. The authors have been successful in developing a phonetically sound invertible non-ambiguous Roman script transliteration system that produces output compatible with most compilers thorough case and diacritic independence. This has allowed the development of programming languages for major paradigms in most North Indian vernaculars and allows Indian language URLs inherently.

A second bottleneck has been the inability to display Indian scripts in "text mode". The existing Indian languages software generally operates in graphics mode or makes use of extra hardware, which adds to the cost of procurement. The authors have succeeded in developing a method for "smart" rendering of North Indian scripts in text-mode without the need for any extra hardware components. The semantics for Assomiya, Bangla, Devnagri and Gujrati scripts have been completed, while those of Oriya and Punjabi are at an advanced stage of development. This has allowed the gap between machine code and graphics development environments to be bridged in North Indian vernaculars, including machine opcode assembly, OS kernel and command shell. The glyphs have been comfortably accommodated in the extended ASCII code-pages with unaltered 7-bit codes. The rendering quality exceeds or at least equals that achieved in most graphics-mode systems.

The bottom-up approach of the project has allowed the authors to maintain uniformity, in selection of tokens (keywords) for matching language constructs across programming paradigms. This promises to increase the gradient of the learning curve for trainees in North Indian vernacular based systems development (programming), as the barrier posed by learning new keywords for increasingly complex paradigms is reduced to negligible.

A certain level of "literate" programming with

support for machine translation of documentation across North Indian vernaculars and English has also been achieved. This allows for programming tasks specified in English to be handled by personnel trained in vernacular programming, with the output product and documentation being acceptable internationally.

The incorporation of higher-level paradigms shall allow the target populace to contribute to the ICT revolution in more ways than the task of simple application development. Logic and functional paradigms shall allow work in Artificial Intelligence to be performed in North Indian vernaculars. The authors' have also applied the system to the development of an intelligent natural-interfaced robotics system.

The complete system, including the design of the Indian vernacular understanding robot, has been made "open-source", with the target of meeting the financial objectives through support services. This shall allow low procurement costs for Indian vernacular development systems, and make the maintenance of the programming system a community effort. This shall also allow the system to be used for pedagogical purposes.

## Methodology and algorithms

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The algorithms developed during the course of the project are enumerated below, followed by a description of the methodology used for developing programming systems in North Indian vernaculars.

1) Romenagri - a non-ambiguous invertible case and diacritic independent compiler acceptable transliteration system with the associated algorithm has been the sole basis for much of the project's motivation. The authors have independently developed it and demonstrated it to be applicable to all languages using the North Indian composite syllabic scripts - viz. Assomiya, Bangla, Devnagri, Gujrati, Oriya and Punjabi. Romenagri utilises syllabic complements in Roman script for the symbols of the North Indian scripts. The mapping for a specific script may be a subset of the complete mapping owing to the absence of certain characters in the specific case, e.g. the wa and ba of Devnagri match a single symbol in Bangla ba. The words are formed by actively concatenating successive syllabic compliments, looked up from a

table through an $O(1)$ search achieved by using the normalised code for the Indian script symbol as an array index. The process of active concatenation uses the “de-voweling” operator carat (^), which forms an equivalent of halanta or hasanta of the Indian scripts and distinguishes the matra of the vowels by preceding the syllabic compliment of their akshara form. The syllabic compliment looked up from the mapping table is pushed onto a stack. On encountering a carat as part of a looked-up compliment, the last pushed vowel character “a” is popped out of the stack and discarded. The remaining part of the compliment, after the carat, is then pushed onto the stack. On encountering the end of a word, the content of the stack is popped to obtain the required transliteration, after which the stack is flushed.

The process of converting Romenagri back to the Indian script representation is more complex and is achieved by using a recursive descent parser. The authors have designed the syllabic compliment so as to facilitate $O(n)$ parsing. The parser operates at 5 levels. The word is submitted at level 1, and the initial syllabic compliments are consumed. Successive levels are entered in case of multiple possibilities with the ultimate level identifying a matra. All other symbols are identified at earlier levels. After each production the parser enters level 1 with the non-consumed part of the input.

The only phonetic modifier used in Romenagri is the underscore “_” character, which generally forms a part of the input set of most compilers. This allows rule adherent transliteration for keywords written in Indian scripts. The underscore characters present in the original Indian script text are expanded to two underscore characters. Hence, the inversion parser treats every paired underscore as a character and every nascent underscore as a phonetic modifier. Figure-1 gives an instance of Romenagri transliteration.

क + ्र + ि + य + ा = क्रिया
 ka + ^ra + ^i + ya + ^aa = kriyaa

Figure 1: An instance of Romenagri transliteration
 with corresponding syllabic compliments

2) APCISR (Anamika Press Code for Indian Script Representation) is a complex of representational semantics for compositional syllabic Indian scripts along with the corresponding set of graphemes,

developed independently by the authors, for use with fixed width console (text-mode) applications. The APCISR uses a 9-grid format to extract the common features of the Indian script symbols. Each feature forms a specific grapheme. The 9-grid consists of three rows, viz. Urdha, Madhya and Nimna, and three columns, viz. Matrik, Lipik and Purak. The Indian script symbols are mapped to their constituent graphemes in one table, with the graphemes being mapped to the corresponding glyphs (character-codes) in another table. Hence, the process of conversion of codes such as ISCII to APCISR is a two-step procedure. The first step (synthesis) consists of combining the grapheme maps of the different Indian symbols, which is algorithmically intensive, while the second step is a straightforward $O(1)$ lookup procedure for obtaining the character values of the corresponding graphemes.

The explanation of the synthesis step requires us to distinguish between the look-up map (LM) and the working-map (WM). The LM is a simple 9-grid grapheme map, while WM consists of three rows of three or more columns, with three cursors pointing out the Matrik, Lipik and Purak columns, each of which can move independently with respect to each other. The LM grapheme maps also contain other related properties of the Indian script symbols, such as how the incorporation of the LM in the WM moves the cursors of the WM. This forms a basis for a set of semantic rules for the synthesis step, such as upon encountering a half consonant the Matrik remains constant while the Lipik and Purak are right shifted by 1 place, making the previous Purak the current Lipik and introducing a new column to the right of the WM, which becomes the new Purak. A normal consonant cursor shift consists of the existing Purak becoming the new Matrik, along with the introduction of two new columns to the right of the WM for the new Lipik and Purak. A normal matra causes no cursor shift. The LM grapheme table also consists of mappings for character combinations (sanyuktakshara or juktakshara), which are treated as a single symbol. Once the position of the cursor has been determined, the LM values are logically AND-ed with the corresponding WM values. However, some scripts deviate from generalisations and require the inclusion of specific rules, which are economically accommodated at the end of the synthesis step. The

process of APCISR conversion is reversible, however the step of character-code rendering introduces some ambiguity prohibiting proper reconstruction, owing to the fact that more than one grapheme may use the same character code. This issue can be addressed by using larger character pages. However, as our objectives do not require the APCISR to be reversible, as the rendering is done just-in-time, and using the same character-code or glyph for different graphemes allows the extended ASCII code-page to accommodate the glyphs while maintaining common graphic symbols such as box and shaded bars, with the 7-bit code page remaining constant. The conversion of the standard international numerals to the corresponding script has been kept optional. APCISR is currently supported on VGA and compatible graphics adapters.

Hindawi includes a rudimentary support for “literate” programming, where documentation is generated from the comments contained in the source code, along with machine translation support for a restricted language subset. This has been achieved by allowing only specific sentence constructions of the SVO form. This is parsed using a yacc grammar followed by a dictionary-based translation. This method allows for the objective of easily convertible documentation to be met, but restricts expressiveness.

The methodology used by the authors for generating various compilers using Romenagri and APCISR consists of writing lexical analysers in lex for translating keywords between the Indian vernacular programming language and a matching programming language in English. Specific language constructs have also necessitated the writing of yacc parsers, especially where semantic changes are necessary. The keywords for matching programming constructs have been kept constant across paradigms. Table-1 lists the common paradigms and their Hindawi equivalent. Table-2 lists the various keywords used for the common programming constructs in Hindawi.

| Programming paradigm | Hindawi shaili |
|------------------------|-----------------|
| 1) Beginners | 1) Prathmika |
| 2) Imperative | 2) Guru |
| 3) Object Oriented | 3) Shraenibadha |
| 4) Logic | 4) Taarkika |
| 5) Functional | 5) Kriyaatmaka |
| 6) Analyser generators | 6) Shabda |
| 7) Parser generators | 7) Vyakarana |

Table 1: Common programming paradigms and their equivalent Hindawi shailis

| | |
|-------|----------|
| For | krama |
| While | jaba tak |
| File | khaata |
| Write | likho |
| Read | poocho |
| If | agar |
| Begin | anu |
| End | purna |

Table 2: Common programming constructs and their Hindawi equivalent for Hindi

GNU GCC has been used as the backend for almost all shailis (programming languages) of Hindawi, allowing portability to heterogeneous platforms. A driver controls the compilation procedure calling various filters and processors alternatively, in a manner similar to that performed by gcc. The specific order of the calls made by the driver is given below.

- a) The source code in ISCII is passed through a filter performing the Romenagri transliteration.
(Under Linux this is preceded by UTF-8 to ISCII conversion.)
- b) The Romenagri source code is then passed through a shaili-specific compiler to obtain gcc compatible source code.
- c) A final call is then made to gcc or g++ depending upon the shaili.

The authors have also developed Lekhak, an IDE for Hindawi, which also doubles as an Indian language word-processor supporting search, cut, copy, paste etc. along with an online help system for Hindawi programming. Hindawi supports graphics under DOS through the Allegro graphics system and support for printing on PCL-compatible printers has been independently developed by the authors. The authors have also enabled Hindawi to be used for robotic systems design and have successfully developed an Indian-language understanding robot using it. A command shell for DOS and Linux has been developed using Hindawi and effort is being put into the early completion of the translation of Linux and FreeDOS kernels to Hindawi.

Financial and social feasibility

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The financial objectives of Hindawi have been

targeted to be met through support services and licensing of non-GPL parts for commercial development. Demonstrations may be downloaded from the authors' website. CD-ROM version of the complete system is made available on request at cost of material and posting only.

The complete system along with the design of the Hindawi based intelligent robot has been made "open-source". This has been done with the primary social objective of tapping into the vast "vernacular-literate" manpower potential in ICT by bridging the language barrier. The provisions for graphics and sound support even at beginners' level promise to make Hindawi popular in a manner similar to the popularity BASIC has gained. The support for higher programming paradigms allows for serious tasks to be based upon Hindawi. The inbuilt "literate" programming and machine translation of documentation, though rudimentary, allow an international feasibility for Hindawi-based development. Open-source software essentially becomes a community maintained product. The authors expect Hindawi's capabilities and popularity to increase with increased effort in its development. The copyright for Hindawi, however, has been retained by the authors, in conformance with GNU General Public Licence V2, in parts that utilise GPL software and only these parts of Hindawi come under GPL, with the sole motive of preventing the development process losing its primary objective. Hindawi, including non-GPL parts, is free for all purposes.

## Conclusion and further work

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A note on the selection of the title "Hindawi" is deserved before concluding. The word Hindawi is of Arabic origin, used to describe "all" regions, their people and languages across the Indus River. The term finds earliest references in the works of Amir Khusro, the renowned poet. The authors chose this word as it is the most appropriate word that may be used to denote "all" the languages of India.

The Hindawi project has yielded many technological benefits such as APCISR and Romenagri along with the feasibility of using vernacular programming at all levels of systems development.

The project is currently in a stable state, but may indeed be considered to be in the infancy of its final goal. Immediate development requirements include completion of representational semantics for the remaining Indian scripts and language mappings for remaining vernaculars. Finally, the authors expect corporates and other financially sound organisations, interested in activities of nation building, to come forward and make an effort towards spreading ICT involvement through vernacular programming. Interested individuals may lend their support through participating in the further development and spread of vernacular programming.