



Inhaltsverzeichnis

1. Modul:Unicode data/Hangul	2
2. Modul:Unicode data	3

Modul:Unicode data/Hangul

Contains data used by [Module:Unicode data](#) to generate the names of characters in the [Hangul Syllables](#) Unicode block.

```
-- Data used to generate the names of characters in the Hangul Syllables block
-- (U+AC00 to U+D7A3).
local Hangul = {}

-- The following leads, vowels, and trails come from here:
-- http://www.unicode.org/Public/UNIDATA/Jamo.txt
Hangul.leads = {
    [0] = "G", "GG", "N", "D", "DD", "R", "M", "B", "BB", "S", "SS",
    "", "J", "JJ", "C", "K", "T", "P", "H"
}
-- not actually used:
Hangul.lead_count = #Hangul.leads + 1

Hangul.vowels = {
    [0] = "A", "AE", "YA", "YAE", "EO", "E", "YEO", "YE", "O", "WA",
    "WAE", "OE", "YO", "U", "WEO", "WE", "WI", "YU", "EU", "YI",
    "I"
}
Hangul.vowel_count = #Hangul.vowels + 1

Hangul.trails = {
    [0] = "", "G", "GG", "GS", "N", "NJ", "NH", "D", "L", "LG", "LM", "LB",
    "LS", "LT", "LP", "LH", "M", "B", "BS", "S", "SS", "NG", "J", "C", "K",
    "T", "P", "H"
}
Hangul.trail_count = #Hangul.trails + 1

--For the term "final", see [[Syllable#Chinese model]].
Hangul.final_count = Hangul.vowel_count * Hangul.trail_count

return Hangul
```

Modul:Unicode data

Inhaltsverzeichnis

1 Usage	3
2 Functions	3
3 Data modules	3
4 Copyright	4

Usage

This module provides functions that access information on Unicode code points. The information is retrieved from data modules generated from the [Unicode Character Database](#), or derived by rules given in the [Unicode Specification](#). It and its submodules were copied from English Wiktionary and then modified; see [there](#) for more information.

Functions

Vorlage:Code

Receives a code point (number) and returns its name or label; for example, **Vorlage:Code** returns **Vorlage:Code**.

For example, **Vorlage:Tnull** → <reserved-0061>

Vorlage:Code

Template-invokable functions that allow access to the functions starting with `lookup` and `is`. Replace the first underscore in the function name with a pipe. For most of the functions, add the code point in hexadecimal base as the next parameter, but for `is_Latin`, `is_rtl`, and `is_valid_pagename`, add text. **HTML character references** in the text are decoded by the module into code points.

For example, **Vorlage:Tnull** → **Lua-Fehler in Zeile 293: attempt to index local 'data_module' (a boolean value)**.

Data modules

The data used by functions in this module is found in **submodules**. Some are generated by **AWK** scripts shown at [User:Kephir/Unicode](#) on English Wiktionary, others by Lua scripts on the `/make` subpages of the submodules.

- [Module:Unicode data/aliases](#): the formal name aliases for characters (from [NameAliases.txt](#))
- [Module:Unicode data/blocks](#): the list of Unicode blocks (from [Blocks.txt](#))
- [Module:Unicode data/category](#): data mapping characters to their General Category (from [DerivedGeneralCategory.txt](#))
- [Module:Unicode data/control](#): data for identifying characters that belong to the General Categories of Separator and Other (from [DerivedGeneralCategory.txt](#))



- [Module:Unicode data/combining](#): data mapping characters to their Combining Classes (from [DerivedCombiningClass.txt](#))
- [Module:Unicode data/Hangul](#): data used to generate the names of [Hangul](#) syllables (from [Jamo.txt](#))
- [Module:Unicode data/scripts](#): data mapping characters to their Unicode script properties (from [Scripts.txt](#)).

The name data modules ([Module:Unicode data/names/xxx](#)) were compiled from [UnicodeData.txt](#). Each one contains, at maximum, code points U+xxx000 to U+xxxFFF. **Lua-Fehler in mw.title.lua, Zeile 206: too many expensive function calls**

Copyright

The Unicode database is released by Unicode Inc. under the following terms:

Copyright © 1991-2018 Unicode, Inc. All rights reserved. Distributed under the Terms of Use in <https://www.unicode.org/copyright.html>.

Permission is hereby granted, free of charge, to any person obtaining a copy of the Unicode data files and any associated documentation (the "Data Files") or Unicode software and any associated documentation (the "Software") to deal in the Data Files or Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Data Files or Software, and to permit persons to whom the Data Files or Software are furnished to do so, provided that either (a) this copyright and permission notice appear with all copies of the Data Files or Software, or (b) this copyright and permission notice appear in associated Documentation.

THE DATA FILES AND SOFTWARE ARE PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE DATA FILES OR SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in these Data Files or Software without prior written authorization of the copyright holder.

```
local p = {}  
  
local floor = math.floor  
  
local function errorf(level, ...)  
    if type(level) == "number" then  
        return error(string.format(...), level + 1)
```



```
        else -- level is actually the format string.
            return error(string.format(level, ...), 2)
        end
    end
end

local function binary_range_search(codepoint, ranges)
    local low, mid, high
    low, high = 1, ranges.length or require "Module:TableTools".length(ranges)
    while low <= high do
        mid = floor((low + high) / 2)
        local range = ranges[mid]
        if codepoint < range[1] then
            high = mid - 1
        elseif codepoint <= range[2] then
            return range, mid
        else
            low = mid + 1
        end
    end
    return nil, mid
end
p.binary_range_search = binary_range_search

--[[
local function linear_range_search(codepoint, ranges)
    for i, range in ipairs(ranges) do
        if range[1] <= codepoint and codepoint <= range[2] then
            return range
        end
    end
end
end
--]]

-- Load a module by indexing "loader" with the name of the module minus the
-- "Module:Unicode data/" part. For instance, loader.blocks returns
-- [[Module:Unicode data/blocks]]. If a module cannot be loaded, false will be
-- returned.
local loader = setmetatable({}, {
    __index = function (self, key)
        local success, data = pcall(mw.loadData, "Module:Unicode data/" .. key)
        if not success then
            data = false
        end
        self[key] = data
        return data
    end
})

-- For the algorithm used to generate Hangul Syllable names,
-- see "Hangul Syllable Name Generation" in section 3.12 of the
-- Unicode Specification:
-- https://www.unicode.org/versions/Unicode11.0.0/ch03.pdf
local name_hooks = {
    { 0x00, 0x1F, "<control-%04X>" }, -- C0 control characters
    { 0x7F, 0x9F, "<control-%04X>" }, -- DEL and C1 control characters
    { 0x3400, 0x4DBF, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Extension A
    { 0x4E00, 0x9FFF, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Extension B
    { 0xAC00, 0xD7A3, function (codepoint) -- Hangul Syllables
        local Hangul_data = loader.Hangul
        local syllable_index = codepoint - 0xAC00

        return ("HANGUL SYLLABLE %s%s%s"):format(
            Hangul_data.leads[floor(syllable_index / Hangul_data.final_syllable_count)],
            Hangul_data.vowels[floor((syllable_index % Hangul_data.final_syllable_count) / Hangul_data.vowel_count)],
            Hangul_data.consonants[floor(syllable_index % Hangul_data.vowel_count)]
        )
    end
}
end
```

```
        / Hangul_data.trail_count)],
        Hangul_data.trails[syllable_index % Hangul_data.trail_co
    end },
    -- High Surrogates, High Private Use Surrogates, Low Surrogates
    { 0xD800, 0xDFFF, "<surrogate-%04X>" },
    { 0xE000, 0xF8FF, "<private-use-%04X>" }, -- Private Use
    -- CJK Compatibility Ideographs
    { 0xF900, 0xFA6D, "CJK COMPATIBILITY IDEOGRAPH-%04X" },
    { 0xFA70, 0xFAD9, "CJK COMPATIBILITY IDEOGRAPH-%04X" },
    { 0x17000, 0x187F7, "TANGUT IDEOGRAPH-%04X" }, -- Tangut Ideograph
    { 0x18800, 0x18AFF, function (codepoint)
        return ("TANGUT COMPONENT-%03d"):format(codepoint - 0x187FF)
    end },
    { 0x18D00, 0x18D08, "TANGUT IDEOGRAPH-%04X" }, -- Tangut Ideograph Supp
    { 0x1B170, 0x1B2FB, "NUSHU CHARACTER-%04X" }, -- Nushu
    { 0x20000, 0x2A6DF, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    { 0x2A700, 0x2B738, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    { 0x2B740, 0x2B81D, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    { 0x2B820, 0x2CEA1, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    { 0x2CEB0, 0x2EBE0, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    -- CJK Compatibility Ideographs Supplement (Supplementary Ideographic Pla
    { 0x2F800, 0x2FA1D, "CJK COMPATIBILITY IDEOGRAPH-%04X" },
    { 0xE0100, 0xE01EF, function (codepoint) -- Variation Selectors Supplem
        return ("VARIATION SELECTOR-%d"):format(codepoint - 0xE0100 + 17)
    end},
    { 0x30000, 0x3134A, "CJK UNIFIED IDEOGRAPH-%04X" }, -- CJK Ideograph Ex
    { 0xF0000, 0xFFFFD, "<private-use-%04X>" }, -- Plane 15 Private Use
    { 0x100000, 0x10FFFFD, "<private-use-%04X>" } -- Plane 16 Private Use
}
name_hooks.length = #name_hooks

local name_range_cache

local function generate_name(data, codepoint)
    if type(data) == "string" then
        return data:format(codepoint)
    else
        return data(codepoint)
    end
end

end

--[
-- Checks that the code point is a number and in range.
-- Does not check whether code point is an integer.
-- Not used
local function check_codepoint(funcName, argIdx, val)
    require 'libraryUtil'.checkType(funcName, argIdx, val, 'number')
    if codepoint < 0 or 0x10FFFF < codepoint then
        errorf("Codepoint %04X out of range", codepoint)
    end
end

end
--]]

-- https://www.unicode.org/versions/Unicode11.0.0/ch04.pdf, section 4.8
function p.lookup_name(codepoint)
    -- U+FDD0-U+FDEF and all code points ending in FFFE or FFFF are Unassigne
    -- (Cn) and specifically noncharacters:
    -- https://www.unicode.org/faq/private_use.html#nonchar4
    if 0xFDD0 <= codepoint and (codepoint <= 0xFDEF
        or floor(codepoint % 0x10000) >= 0xFFFFE) then
        return ("<noncharacter-%04X>"):format(codepoint)
    end
end
```

```
    if name_range_cache -- Check if previously used "name hook" applies to the
        and codepoint >= name_range_cache[1]
        and codepoint <= name_range_cache[2] then
            return generate_name(name_range_cache[3], codepoint)
        end

    local range = binary_range_search(codepoint, name_hooks)
    if range then
        name_range_cache = range
        return generate_name(range[3], codepoint)
    end

    local data = loader[('names/%03X'):format(codepoint / 0x1000)]

    if data and data[codepoint] then
        return data[codepoint]

        -- Unassigned (Cn) consists of noncharacters and reserved characters.
        -- The character has been established not to be a noncharacter,
        -- and if it were assigned, its name would already have been retrieved,
        -- so it must be reserved.
    else
        return ("<reserved-%04X>"):format(codepoint)
    end
end

end

--[[
-- No image data modules on Wikipedia yet.
function p.lookup_image(codepoint)
    local data = loader[('images/%03X'):format(codepoint / 0x1000)]

    if data then
        return data[codepoint]
    end
end
--]]

local planes = {
    [ 0] = "Basic Multilingual Plane";
    [ 1] = "Supplementary Multilingual Plane";
    [ 2] = "Supplementary Ideographic Plane";
    [ 3] = "Tertiary Ideographic Plane";
    [14] = "Supplementary Special-purpose Plane";
    [15] = "Supplementary Private Use Area-A";
    [16] = "Supplementary Private Use Area-B";
}

-- Load [[Module:Unicode data/blocks]] if needed and assign it to this variable.
local blocks

local function block_iter(blocks, i)
    i = i + 1
    local data = blocks[i]
    if data then
        -- Unpack doesn't work on tables loaded with mw.loadData.
        return i, data[1], data[2], data[3]
    end
end

end

-- An ipairs-type iterator generator for the list of blocks.
function p.enum_blocks()
    local blocks = loader.blocks
    return block_iter, blocks, 0
end

end
```

```
function p.lookup_plane(codepoint)
    local i = floor(codepoint / 0x10000)
    return planes[i] or ("Plane %u"):format(i)
end

function p.lookup_block(codepoint)
    local blocks = loader.blocks
    local range = binary_range_search(codepoint, blocks)
    if range then
        return range[3]
    else
        return "No Block"
    end
end

function p.get_block_info(name)
    for i, block in ipairs(loader.blocks) do
        if block[3] == name then
            return block
        end
    end
end

function p.is_valid_pagename(pagename)
    local has_nonws = false

    for cp in mw.ustring.gcodepoint(pagename) do
        if (cp == 0x0023) -- #
        or (cp == 0x005B) -- [
        or (cp == 0x005D) -- ]
        or (cp == 0x007B) -- {
        or (cp == 0x007C) -- |
        or (cp == 0x007D) -- }
        or (cp == 0x180E) -- MONGOLIAN VOWEL SEPARATOR
        or ((cp >= 0x2000) and (cp <= 0x200A)) -- spaces in General Punct
        or (cp == 0xFFFFD) -- REPLACEMENT CHARACTER
        then
            return false
        end

        local printable, result = p.is_printable(cp)
        if not printable then
            return false
        end

        if result ~= "space-separator" then
            has_nonws = true
        end
    end

    return has_nonws
end

local function manual_unpack(what, from)
    if what[from + 1] == nil then
        return what[from]
    end

    local result = {}
    from = from or 1
    for i, item in ipairs(what) do
        if i >= from then
            table.insert(result, item)
        end
    end
end
```



```
        end
    end
    return unpack(result)
end

local function compare_ranges(range1, range2)
    return range1[1] < range2[1]
end

-- Creates a function to look up data in a module that contains "singles" (a
-- code point-to-data map) and "ranges" (an array containing arrays that contain
-- the low and high code points of a range and the data associated with that
-- range).
-- "loader" loads and returns the "singles" and "ranges" tables.
-- "match_func" is passed the code point and either the data or the "dots", and
-- generates the final result of the function.
-- The varargs ("dots") describes the default data to be returned if there wasn't
-- a match.
-- In case the function is used more than once, "cache" saves ranges that have
-- already been found to match, or a range whose data is the default if there
-- was no match.
local function memo_lookup(data_module_subpage, match_func, ...)
    local dots = { ... }
    local cache = {}
    local singles, ranges

    return function (codepoint)
        if not singles then
            local data_module = loader[data_module_subpage]
            singles, ranges = data_module.singles, data_module.ranges
        end

        if singles[codepoint] then
            return match_func(codepoint, singles[codepoint])
        end

        local range = binary_range_search(codepoint, cache)
        if range then
            return match_func(codepoint, manual_unpack(range, 3))
        end

        local range, index = binary_range_search(codepoint, ranges)
        if range then
            table.insert(cache, range)
            table.sort(cache, compare_ranges)
            return match_func(codepoint, manual_unpack(range, 3))
        end

        if ranges[index] then
            local dots_range
            if codepoint > ranges[index][2] then
                dots_range = {
                    ranges[index][2] + 1,
                    ranges[index + 1] and ranges[index + 1][1]
                }
            else -- codepoint < range[index][1]
                dots_range = {
                    ranges[index - 1] and ranges[index - 1][2],
                    ranges[index][1] - 1,
                }
            end
            return match_func(codepoint, manual_unpack(dots_range, 3))
        end

        table.sort(cache, compare_ranges)
    end
end
```

```
        end
        return match_func(codepoint)
    end
end

-- Get a code point's combining class value in [[Module:Unicode data/combining]]
-- and return whether this value is not zero. Zero is assigned as the default
-- if the combining class value is not found in this data module.
-- That is, return true if character is combining, or false if it is not.
-- See https://www.unicode.org/reports/tr44/#Canonical\_Combining\_Class\_Values for
-- more information.
p.is_combining = memo_lookup(
    "combining",
    function (codepoint, combining_class)
        return combining_class and combining_class ~= 0 or false
    end,
    0)

function p.add_dotted_circle(str)
    return (mw.uststring.gsub(str, ".",
        function(char)
            if p.is_combining(mw.uststring.codepoint(char)) then
                return '◌' .. char
            end
        end))
end

end

local lookup_control = memo_lookup(
    "control",
    function (codepoint, ccc)
        return ccc or "assigned"
    end,
    "assigned")
p.lookup_control = lookup_control

function p.is_assigned(codepoint)
    return lookup_control(codepoint) ~= "unassigned"
end

function p.is_printable(codepoint)
    local result = lookup_control(codepoint)
    return (result == "assigned") or (result == "space-separator"), result
end

function p.is_whitespace(codepoint)
    local result = lookup_control(codepoint)
    return (result == "space-separator"), result
end

p.lookup_category = memo_lookup(
    "category",
    function (codepoint, category)
        return category
    end,
    "Cn")

local lookup_script = memo_lookup(
    "scripts",
    function (codepoint, script_code)
        return script_code or 'Zzzz'
    end,
    "Zzzz")
p.lookup_script = lookup_script
```

```
function p.get_best_script(str)
  -- Check type of argument, because mw.text.decode coerces numbers to strings
  require "libraryUtil".checkType("get_best_script", 1, str, "string")

  -- Convert HTML character references (including named character references
  -- or character entities) to characters.
  str = mw.text.decode(str, true)

  local scripts = {}
  for codepoint in mw.ustr.gcodepoint(str) do
    local script = lookup_script(codepoint)

    -- Ignore "Inherited", "Undetermined", or "Uncoded" scripts.
    if not (script == "Zyyy" or script == "Zinh" or script == "Zzzz")
      scripts[script] = true
    end
  end

  -- If scripts does not contain two or more keys,
  -- return first and only key (script code) in table.
  if not next(scripts, next(scripts)) then
    return next(scripts)
  end -- else return majority script, or else "Zzzz"?
end

function p.is_Latin(str)
  require "libraryUtil".checkType("get_best_script", 1, str, "string")
  str = mw.text.decode(str, true)

  -- Search for the leading bytes that introduce the UTF-8 encoding of the
  -- code points U+0340-U+10FFFF. If they are not found and there is at least
  -- one Latin-script character, the string counts as Latin, because the rest
  -- of the characters can only be Zyyy, Zinh, and Zzzz.
  -- The only scripts found below U+0370 (the first code point of the Greek
  -- and Coptic block) are Latn, Zyyy, Zinh, and Zzzz.
  -- See the codepage in the [[UTF-8]] article.
  if not str:find "[\205-\244]" then
    for codepoint in mw.ustr.gcodepoint(str) do
      if lookup_script(codepoint) == "Latn" then
        return true
      end
    end
  end

  local Latn = false

  for codepoint in mw.ustr.gcodepoint(str) do
    local script = lookup_script(codepoint)

    if script == "Latn" then
      Latn = true
    elseif not (script == "Zyyy" or script == "Zinh"
      or script == "Zzzz") then
      return false
    end
  end

  return Latn
end

-- Checks that a string contains only characters belonging to right-to-left
-- scripts, or characters of ignorable scripts.
function p.is_rtl(str)
```

```
require "libraryUtil".checkType("get_best_script", 1, str, "string")
str = mw.text.decode(str, true)

-- Search for the leading bytes that introduce the UTF-8 encoding of the
-- code points U+0580-U+10FFFF. If they are not found, the string can only
-- have characters from a left-to-right script, because the first code point
-- in a right-to-left script is U+0591, in the Hebrew block.
if not str:find "[\\214-\\244]" then
    return false
end

local result = false
local rtl = loader.scripts.rtl
for codepoint in mw.ustr.gcodepoint(str) do
    local script = lookup_script(codepoint)

    if rtl[script] then
        result = true
    elseif not (script == "Zyyy" or script == "Zinh"
                or script == "Zzzz") then
        return false
    end
end

return result
end

local function get_codepoint(args, arg)
    local codepoint_string = args[arg]
        or errorf(2, "Parameter %s is required", tostring(arg))
    local codepoint = tonumber(codepoint_string, 16)
        or errorf(2, "Parameter %s is not a code point in hexadecimal base",
            tostring(arg))
    if not (0 <= codepoint and codepoint <= 0x10FFFF) then
        errorf(2, "code point in parameter %s out of range", tostring(arg))
    end
    return codepoint
end

local function get_func(args, arg, prefix)
    local suffix = args[arg]
        or errorf(2, "Parameter %s is required", tostring(arg))
    suffix = mw.text.trim(suffix)
    local func_name = prefix .. suffix
    local func = p[func_name]
        or errorf(2, "There is no function '%s'", func_name)
    return func
end

-- This function allows any of the "lookup" functions to be invoked. The first
-- parameter is the word after "lookup_"; the second parameter is the code point
-- in hexadecimal base.
function p.lookup(frame)
    local func = get_func(frame.args, 1, "lookup_")
    local codepoint = get_codepoint(frame.args, 2)
    local result = func(codepoint)
    if func == p.lookup_name then
        -- Prevent code point labels such as <control-0000> from being
        -- interpreted as HTML tags.
        result = result:gsub("<", "&lt;")
    end
    return result
end
```



```
function p.is(frame)
  local func = get_func(frame.args, 1, "is_")

  -- is_Latin and is_valid_pagename take strings.
  if func == p.is_Latin or func == p.is_valid_pagename or func == p.is_rtl
    return (func(frame.args[2]))
  else -- The rest take code points.
    local codepoint = get_codepoint(frame.args, 2)
    return (func(codepoint)) -- Adjust to one result.
  end
end
end
return p
```