Cheatography

COMP204 Final Cheat Sheet

by cp2300 via cheatography.com/103341/cs/21267/

Binary Numbers

$89_{10} = ?_2$

	result	remainder
divide 89 by two	44	1
divide 44 by two	22	0
divide 22 by two	11	0
divide 11 by two	5	1
divide 5 by two	2	1
divide 2 by two	1	0
divide 1 by two	0	1

So: $89_{10} = 1011001_2$.
Check : $89_{10} = (1 \times 2^6)+(0 \times 2^5)+(1 \times 2^4)+(1 \times 2^3)+(0 \times 2^2)+(0 \times 2^1)+(1 \times 2^0)$.

Binary Numbers

8 bits	1 byte
16 bits	word
32 bits	double word
always at least 1 byte	add one to first number in sequence to make negative, add zeros to get full byte

Machine Learning

-program adjusts itself automatically to fit data, end result is a program trained to achieve a given task

Supervised learning-given examples of input and desired outputs, predict outputs on future unseen inputs(classification, regression, time series)

Unsupervised learning-creates a new representation of the input

Reinforcement learning-learning action to maximize payoff

Types of supervised learning tasks

1. classification- predict which predefined set of classes and example belongs to

2. regression - predict a real value

2. probability estimation - estimate probability of an event

Sensitivity = fraction of positive examples predicted to be positive

TP/(TP+FN)

Specificity= proportion of negative examples predicted negative

TN/(FP+TN)

Machine Learning (cont)

False-positive rate(FPR)= negatives predicted to be positive

FP/(FP+TN)

Sets

Set	stores an unordered set of objects, CANT BE INDEXED, no duplicates, only immutable objects contained
myset = set([])	creates a set from a list
len(myset)	length of the set
if x in myset:	evaluates boolean condition
for element in myset:	iterate through set
for set1 = A and set2 = B, A&B = intersection	elements in common to A and B
A | B or A.union(B)	union of two sets
A-B	difference of sets, elements in A that are not in B
	all these rules can be applied to multiple sets

Integer Sequences

range(start, end, step)	(start default is zero, step default 1)
range(5)	0 1 2 3 4
range(3,8)	3 4 5 6 7
range(len(seq))	sequence of index of values in seq
range(2,12,3)	2 5 8 11

Functions

def functionname(arguments):	defines a function of given name with given arguments
return	only returns a certain value or string generated by the function, doesn't print, exits at this value
list = [[0 for i in range(ncols)] for j in range(nrowns)]	creates a two dimensional list of nrows and ncols filled with zeros

Operations on Lists

lst = []	creates empty list
lst.append(val)	adds item to list at end
lst.extend(seq)	add sequence of items at end
lst.insert(idx, val)	inserts item at index
lst.remove(val)	remove first item in the list with value val
lst.pop(idx)	remove and return item at index
lst.sort()/lst.reverse()	sort/reverse list in place
lst.min()/.max()	finds the min/max

matplotlib.pyplot

.plot(x,y, color)	plots the x values to x values in a certain color
.show()	shows the graph
.ylabel(name)	names y axis
.xlabel(name)	names x axis
.savefig(figname)	saves image under figname

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Published 5th December, 2019.
Last updated 5th December, 2019.

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OOP

class	defines attributes(information we want to keep together) and methods(operations want to be able to perform on that data)
class some_class_name:	defines a class of some_class_name
def __int__(self, other attributes):	defines and initializes attributes
object.method()	calls method on an object of that class

Bugs

Sytax errors	violation of a writing rule
Exceptions(runtime)	syntax is fine, some other thing is occasionally flawed:ZeroDivisionError(can't divide by zero), NameError-(can't access the variable), IndexError(When the index you are attempting to access does not exist), TypeError(operation on non-compatible type)
Logical (semantic) errors	code runs, but doesn't do what its supposed to
try:	does something that may cause an exception
except <SomeExceptionType>:	do something to handle the exception
raise[exception object]	raises a certain, defined type of exception

Bugs (cont)

try, except, else	try something, that could cause the exception, if its fine, go to else
finally:	adds statement that happens no matter what
for a, b in zip(list 1, list 2):	iterates over elements of two lists in parallel, yields a tuple with both iterations

File Input/Output

f = open(myfile, 'x')	opens the file, x=r for reading only, x=w for writing only, x=a for appending, x=b for file in binary format, x=wr+ reading and writing and so on
.read(-size)	reads the entire file, returns a single string, size is optional number of characters
.readlines(size)	reads all lines and returns them as a list of strings
.rstrip()	returns a string with the end-of-line character(\n) removed from the end of the string
.readline()	reads single line from file, returns empty string if end of file
.close()	closes file
gzip.open()	interface to read/write compressed files, .gz extension

Operations on Dictionaries

dict = {}	sets up an empty dictionary
dict[key] = value	sets value of said at that key to value
dict[key]	calls the value at that key
del dict[key]	deletes a key from dict
dict.clear()	clears the dict of all keys
dict.update(dict2)	can update/add associations from another
dict.keys()/-dict.items()/dict.values()	looks at either all keys, values, or all items in the dict
dict.pop(key)	removes element associated to that key
dict.popitem()	removes key, value pair and returns it as a tuple
dict.get(key)	returns value at that key
dict.setdefault(key)	either returns value of the key or creates the given key if not previously existent

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