





















v. @ apha

v  
v

v.7@- 8@,c#9

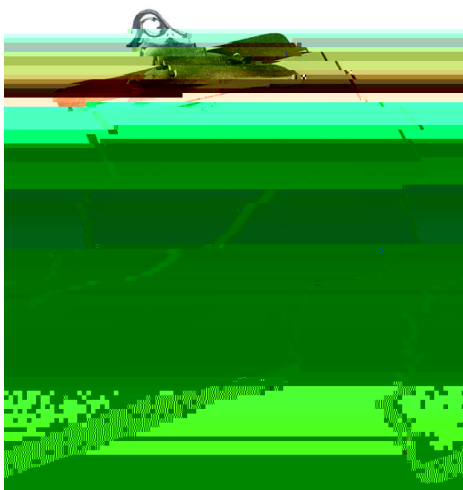
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## 2.2 Tools for Analyzing And Manipulating Patterns

Tool level!,

- enSil &ar#! on paper.

40 \$ , - . , "





( - " " ) - . -

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Exploring STEM

~~E7o12~~  
Eo8

4x!tead o\* %!ixg per&%tatiox! o\* xa&e!+ let! %!e per&%tatiox! taat ax be  
 \*or&ed by o\* tae Exgli!h alpaabet be a%!e tae y ta#e %p le!! !pa\$e " aen  
 prixted. 1 e " ill !tart " ith # letter! axd " or# %p \*ro& taere. =o" &axy  
 di\*\*erent patterx! an be \*or&ed by tae letter! axd " K,

" 0 ' 1 23 (\$67  
 - ', 33 (\$6(3\$( 66

4t loo#! li#e t" o patterx!. 1 aat abo%t ( letter!K,

" 0 ' 1 23 (\$(#67  
 - ', 33 (\$(#6(3 (#(\$6(3#( (\$6(3\$( (#6(3\$(#( 6(3#(\$ ( 66

Tae total x%&ber o\* patterx! i! 6. Tae \*ollo" ixg t" o exa&ple! !ho" tae x%&ber  
 o\* per&%tatiox patterx! taat ax be generated " ith / axd ; letter!,

" 0 ' 1 23 (\$(#( 67



! \*%n\$tion do the looping \*or %!,

( , \*++

8†-ñ 2 3 4 5 6 7 8 9 0 (\$(#( ( ( ( (

ø





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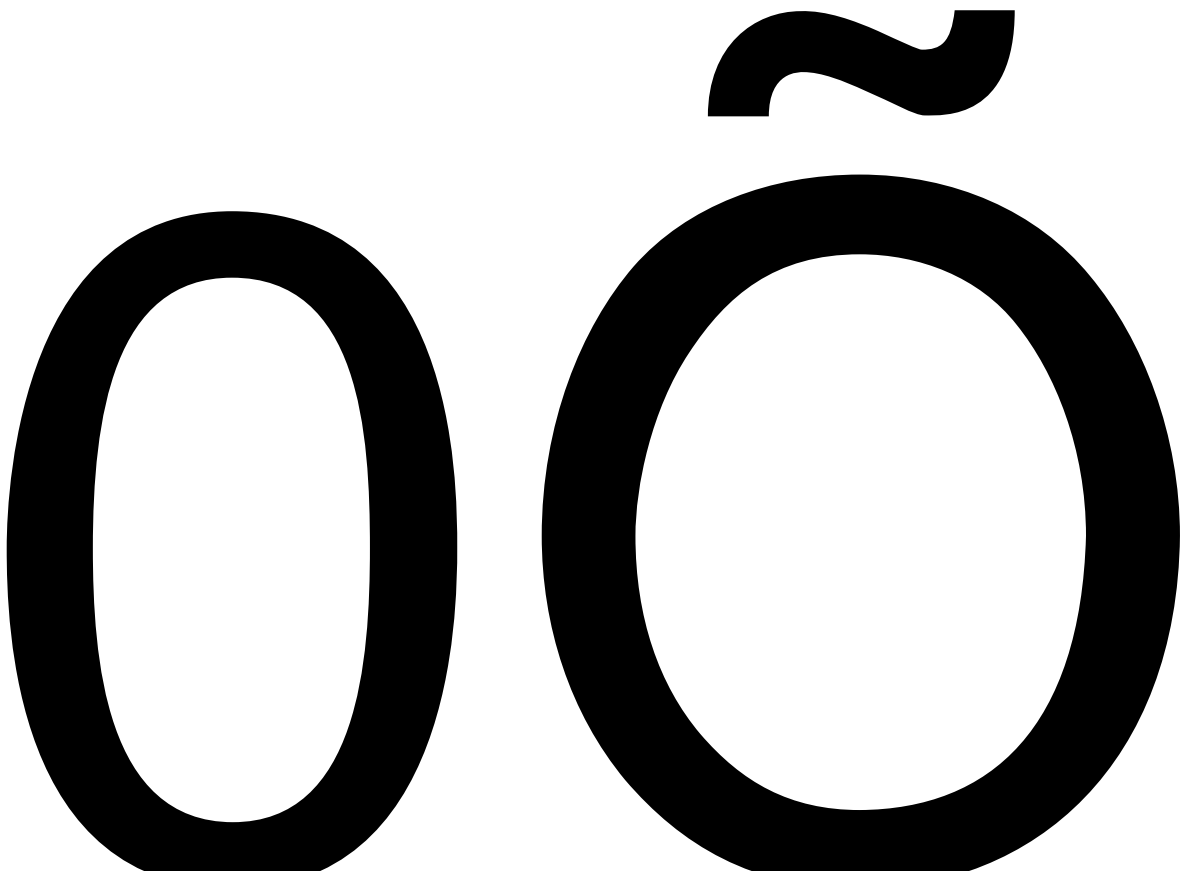






Sal\$%lating the !%&! o\* enor&o%! !e2%enSe! o\* integer! that i! analogo%! to the  
one%toBethepacP&XtationTve%at\$'to9!ed to 2%i\$#ly Sal\$%late the !i:e o\*  
enor&o%! per&%tation pattern !paSe!.

The an!" er i! A`



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the !%& o\* ea\$h \$ol%&n i! 2P1 < (. 4\* the highe!t n%&ber i! 5+ the !%& o\* ea\$h \$ol%&n i! 5P1<8+ and !o on.

### 3.2.3.2 Switc!ing "o &at!ematical 1otation

=o" ever+ in!tead o\* %!ing the phra!e 7and !o on7 to indi\$ate that thi! pattern " ill  
" or# \*or any !e2%en\$e o\* integer! \*ro& 1 to a given n%&ber+ a better " ay i! to  
expre!y i6n\*P`r QOA@n y -







/ ' : "



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$$\begin{array}{ccccccc} & & 3 & & & & \\ & & 2x & 2 & 4 & 6 & 12 \\ & 1 & & & & & \end{array}$$





" ? ( # ( # ? ( ' , L , ( C # , #

( , \*++

( ( 8 9 8





Expression  $\forall n \in \mathbb{N} \exists m \in \mathbb{N} (m > n)$  the natural numbers are defined using Peano notation,

2.1

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2 i!  $\frac{2}{1}$  + and !o on.

\*













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" 0 ;2 7
- ' ,
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" 0 ;2 7
- ' ,
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" 0 ;2 7
- ' ,
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" 0 ;2 7
- ' ,
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DotiSe that even tho%gh the !y!te& h4h txPr g h. te&peSy2

\* ( ( " 7 7 - @& 7 ? b7 P P/Q @ " 7 P



N











- probability is represented with a real number between 0 and 1 or 0M and 100MA in\$ive.

' probability of 0 &ean! that the event " ill not o\$\$%r.

Oare event! have probabilitie! " hi\$h are \$lo!e to 0.

Co&&on event! have probabilitie! " hi\$h are \$lo!e to 1.

' probability of 1 &ean! that the event " ill de\*initely o\$\$%r.

The !%& of all the prob\$itie! \*or the event! in a given t&ple !\$e



















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The W axis has been labeled  $W$ .  $W$  represents the variation in the given list and the L axis has been labeled  $L$ .  $L$  represents the variation in the given list. The series of  $n$  in the list has been given the title  $n$  to  $W$  to  $L$  the data can be









/ ) , , #? ' , , #?  
#?1 0 #?1 ( , #?













| |

C.2 S!ooting At A "arget

+

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' \$ : /  
'## = '  
- ' \$ : .





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/	#?	/	#?	:	\$	,			
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/	#?	/	#?	:	\$	,	G	9	%
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.	'	\$	,						





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R %      =      #
R %      =      #

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; C .    ,
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R %      %      3 ( ( ( ( ( ( ( ( ( 6
5  PmO

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**C.E**



!

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\$# + ! ( # ( . : JK = ' .

&

\$# = ' ( = ' .

\$# . : JK = ' ( : JK = ' .

&

+ \$ \$ , % C + ( = ' ' \$ : . ,

+ \$ \$ , % ? +





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Thi! plot ha! @+ point! and the " \* )  
 . Setting E to + prod%\$e! +, + point! and the plot that  
 i! prod%\$ed doe! ) ) " \*

Even tho%gh there are an ' " ' that \$o%ld be plotted \*or a  
 \*%n\$tion+ thi! plot !ho" ! that ' need to be plotted !o that  
 there are ) " bet" een the point!. ' ll plotting \*%n\$tion! %!e thi!



9 3: (



' ' ( ) \*+ , +  
- ' , Q # = ,  
' ' ,







