"dits-dahs"

Input	Standard Input & File
Output	Standard Output

Problem Description

Swallow Reef, also known as Pulau Layang-Layang, is an oceanic atoll of the Spratly Islands administered by Malaysia, which is situated approximately 300 kilometres northwest of Kota Kinabalu, Sabah. The atoll is about 7 km long and 2 km wide. There is a lighthouse on the atoll that sends weather and security conditions periodically to the mainland. Due to the long distance and atmospheric surroundings which are not conducive to modern telecommunications, the only means of communication is by using ***Morse Code*** over a low powered radio transceiver.

Morse code is a method used in telecommunication to encode text characters as standardized sequences of two different signal durations, called *dots* and *dashes* or *dits* and *dahs*. Morse code is named after Samuel Morse, an inventor of the telegraph. The International Morse Code encodes the 26 English letters A through Z, some non-English letters, the Arabic numerals (ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9) and small set of punctuation and procedural signals (prosigns). There is no distinction between upper and lower case letters. The following figure shows a list of Morse codes for characters, symbols and Arabic numerals.

Morse Code:

A	.-	N	-.	.	.-.-.-	1	.----
B	-...	O	---	,	--..--	2	..---
C	-.-.	P	.--.	:	---...	3	...--
D	-..	Q	--.-	"	.-..-.	4	....-
E	.	R	.-.	'	.----.	5	.....
F	..-.	S	...	!	-.-.--	6	-....
G	--.	T	-	?	..--..	7	--...
H	....	U	..-	@	.--.-.	8	---..
I	..	V	...-	-	-....-	9	----.
J	.---	W	.--	;	-.-.-.	0	-----
K	-.-	X	-..-	(	-.--.		
L	.-..	Y	-.--	)	-.--.-		
M	--	Z	--..	=	-...-		

Figure 1 - Morse Code - Letters conversion

Morse Code needs trained and experienced officers to be able to communicate efficiently and not easy to obtain as Morse Code usage is getting less and lesser by time. Thus it is best to have a program that can encode and decode Morse messages so that any officer can read or send them in plain text. Your task is to create the java program to help officer to encode and decode the code Morse. You must use appropriate data structure for all Morse code (as in Fig 1) by ensuring that each code is unique.

Although in real life, the codes are send as sounds, in this program, dots are written as "." and dashes/dahs are "-". Letters are separated by a space, while one word to another are separated by two spaces.

The program should print a menu to perform three main process; sending, receiving and display all letters and Morse code.

i. ***The sending part*** should be able to encode or convert any letters in Fig 1 to Morse Code and ready to be sent across to the other side. Every message must starts with "VV" or "…- …-" and ends with "EOM" or ". --- --" . To ensure the integrity of each message, a transmission summary must be appended after the "EOM" marker. The summary must contain:
    1. Number of lines in the message.
    2. Number of words
    3. Number of Alphabets
    4. Number of Symbols
    5. Number of numbers (Arabic numerals)

    An "EOT" marker must be put at the end of the transmission summary.

ii. ***The receiving part*** should be able to decode the Morse message and transmission summary into readable letters. For the verification purposes, a summary analysis will be generated based on the decoded message to be compared with the transmission summary from the sender. The comparison will print out "*Consistent Summary*" if the two messages equal, otherwise print "*Inconsistent Summary*".

iii. ***Display all letters and Morse Code part*** should print out all letters with Morse code in the format of 5 output in a row using one of the data structure traversal method. (Hint: use format "\t" in the print statement to make space in between output)

Sample Input-output table shows the example of valid input with the corresponding output. Your program need to consider the invalid input.

You can refer to any online link to check the result of decode and encode the Morse Code. (example: https://morsecode.world/international/translator.html)

Sample Input/output

Input	Output
1 VV Sunny sky wind 40 knots temp 35C EOM	...- ...- ... ..- -. -. -.-- ... -.- -.-- .-- .. -. -.. ....- ----- -.- -. --- - ... - . -- .--. ...-- ..... -.-. . --- -- ..... ----. ...-- .---- ----- ....- . --- - Menu: 1. Send Morse Message 2. Receive Morse Message 3. Print Letters and Morse Code 4. Exit Input code:
2 ...- ...- ... ..- -. -. -.-- ... -.- -.-- .-- .. -. -.. ....- ----- -.- -. --- - ... - . -- .--. ...-- ..... -.-. . --- -- ..... ----. ...-- .---- ----- ....- . --- -	VV SUNNY SKY WIND 40 KNOTS TEMP 35C EOM 5 9 31 0 4 EOT 5 9 31 0 4 Result: Consistent Summary Menu: 1. Send Morse Message

	2. Receive Morse Message 3. Print Letters and Morse Code 4. Exit Input code:
3	5 ..... H .... 4 ....- S ... V ...- 3 ...-- I .. F ..-. U ..- ? ..--.. 2 ..--- E . L .-.. " .-..-. R .-. . .-.-.- A .- P .--. @ .--.-. W .-- J .--- ' .----. 1 .---- 6 -.... - -....- B -... = -...- D -.. X -..- N -. C -.-. ; -.-.-. ! -.-.-- K -.- (-.--.) -.--.- Y -.-- T - 7 --... Z --.. , --..-- G --. Q --.- M -- : ---... 8 ---.. O --- 9 ----. 0 ----- Menu: 1. Send Morse Message 2. Receive Morse Message 3. Print Letters and Morse Code 4. Exit Input code:
4	Bye dits-dahs..

DELIVERABLES AND SUBMISSION

Your report should include the following information submitted in 2 files:

File	Named & format file	Details	%
1	<Matric>_File1.pdf	1. Describes all data structures used in *dits-dahs* problem. 2. Illustrates the structure of Morse Code after insert all the letters used. 3. Describes all classes used in *dits-dahs* (list all attributes and methods involve in each class and state the objective). 4. Algorithm for: i. Main method ii. Encode method iii. Decode method iv. Display all letters and Morse code. 5. Any assumptions that you made. 6. Input-Output Screen short	10% Marks
2	<Matric>_File2.dat	7. Data File/s	
3	<Matric>_filename1.java <Matric>_filename2.java <Matric>_filename3.java	8. Full Java codes of *dits-dahs*.	20% Marks
		Total	**30%**

Zipped all files and submit to UKMFolio by 3/7/2020 before 5pm.

-SELAMAT MAJU JAYA-