

JAVA PROGRAMMING

(340)

REGIONAL – 2018

Production Portion:

Program 1: Communications _____ (345 points)

TOTAL POINTS _____ (***345 points***)

Failure to adhere to any of the following rules will result in disqualification:

1. Contestant must hand in this test booklet and all printouts. Failure to do so will result in disqualification.
2. No equipment, supplies, or materials other than those specified for this event are allowed in the testing area. No previous BPA tests and/or sample tests or facsimile (handwritten, photocopied, or keyed) are allowed in the testing area.
3. Electronic devices will be monitored according to ACT standards.

No more than ten (10) minutes orientation
No more than ninety (90) minutes testing time
No more than ten (10) minutes wrap-up

Property of Business Professionals of America.
May be reproduced only for use in the Business Professionals of America
Workplace Skills Assessment Program competition.

You will have ninety (90) minutes to complete your work.

Your name and/or school name should *not* appear on work you submit for grading.

1. Create a folder on the flash drive provided using your contestant number as the name of the folder.
2. Copy your entire solution/project into this folder.
3. Submit your entire solution/project so that the graders may open your project to review the source code.
4. Ensure that the files required to run your program are present and will execute on the flash drive provided.

*Note that the flash drive letter may *not* be the same when the program is graded as it was when you created the program.

*It is recommended that you use relative paths rather than absolute paths to ensure that the program will run regardless of the flash drive letter.

The graders will *not* compile or alter your source code to correct for this.
Submissions that do *not* contain source code will *not* be graded.

Assumptions to make when taking this assessment:

- The input file will contain only ASCII characters.
- A test input file will be available and named, "communications.txt."

Development Standards:

- Your Code must use a consistent variable naming convention.
- All subroutines, functions, and methods must be documented with comments explaining the purpose of the method, the input parameters (if any), and the output (if any).
- If you create a class, then you must use Javadoc comments.

Communications Officer

Congratulations! You have been selected from Starfleet Academy to crew the new starship Venture on its shakedown voyage to the Ferengi System. The Venture's ship number is BPA 1702.

Interstellar messages can be damaged or intercepted and changed when travelling through space. The Ferengi are notoriously dishonest and quite capable of disrupting communications. Your first duty as Communications Officer is to receive messages from Starfleet Command, confirm the accuracy of the transmission and send coded confirmations back to Starfleet.

Input:

The input to this problem consists of a text file. The first line of the text file contains a single decimal integer that indicates the number of lines to be checked. The next lines will have the following coded information:

Position 1 – 3 integer, the message number

Position 4 is a space

Position 5 – 9 integer, control total of the integer values of characters in the message (excluding “over”)

Position 10 is a space

Position 11 – 13 integer, the number of characters in the message (including spaces and excluding “over”)

Position 14 is a space

Position 15 starts the message text (length will vary), the message to validate and encode

The first three positions are the message number.

Positions 5 to 9 contain a check total that is calculated by adding the ASCII base 10 code values of all the characters in the message section. You will calculate the total from the message you received and confirm that your total matched the control total from the transmission

Positions 11 to 13 contain the number of letters in the message. You must verify that all letters in the message have been received and that no letters have been added or deleted.

Position 15 starts the actual message that you must verify. Delete any spaces at the beginning of the message. All messages end with the word “over” to signify the end of the transmission. “over” is not part of the message to be checked.

“over” is used to signal the end of the transmission. Every incoming and outgoing message must end in “over.”

Output:

The output consists of two lines of text for each input line and a blank line after the two lines of text. The first line shows if the transmission was confirmed or, if not, the reason or reasons why it was not confirmed. The second line contains the original message, including “ over”, to be sent back in encoded format; this allows Starfleet to confirm the original message. The transmission must end with “ over” in addition to the encoded original message. (one space precedes the word over). If the incoming message does not end with “ over” convert the message exactly as is without the “ over”, but you must still add “ over” to the end of your transmission as specified above.

Transmission messages:

“transmission xxx confirmed” – all checks completed correctly

“length error” – length does not match the number of letters supposed to be in the transmission

“check total error” – calculated character total does not match the transmitted check total

“incomplete transmission” – transmission message does not end in “ over”

Note: multiple Transmission messages must be separated by commas

To encode the original message all f’s are replaced with B, all F’s with P, all e’s with A, all spaces with e, and all t’s with “>?”. Substitutions must be made in this sequence.

Example input:

4

105 02442 025 proceed to Ferengi system over

442 02343 008 test 442 over

302 01737 008 Ferengi are honest over

2 03333 022 spend money in the Ferengi system

Example output:

transmission 105 confirmed

procAAde>?/oePArAngiesys>?/AmeovAr over

transmission 442 check total error

>?/As>?/e442eovAr over

transmission 302 length error

PArAngiearAehonAs>?/eovAr over

transmission 002 length error, check total error, incomplete transmission

spAndemonAyeine>?/hAePArAngiesys>?/Am over

Requirements:

1. You must create an application with the main class named *Communications*.
2. Your contestant number must appear as a comment at the top of the main source code file.
3. If the input file is not found, then the program should display an appropriate message and exit.
4. The program will perform the required tasks correctly for however many transmissions are indicated in the input file.
5. The program must implement methods to:
 - a. verify the length
 - b. verify the check total
 - c. verify the transmission ends in “over”
 - d. encode the original message.
 - e. Print the confirmation message
6. The program will display the output like the example above for all of the values in the input file.

Your application will be graded on the following criteria:

Solution and Project

The project is present on the flash drive	_____	10 points
The projects main class is named Communications	_____	10 points

Program Execution

The program runs from the USB flash drive	_____	15 points
---	-------	-----------

If the program does *not* execute, then the remaining items in this section receive a score of zero.

The program runs and reads the input file	_____	20 points
The program displays an error message if the file cannot be found	_____	20 points
The program displays the 3-digit transmission number	_____	10 points
The program displays “confirmed” if transmission passes all checks	_____	20 points
The program displays “length error” correctly	_____	20 points
The program displays “check total error” correctly	_____	20 points
The program displays “incomplete transmission error” correctly	_____	20 points
The program displays the encoded original message adding “ over” at the end	_____	30 points

Source Code Review

The source code is properly commented		
A comment containing the contestant number is present	_____	10 points
Methods and code sections are commented	_____	20 points
A method exists to perform the “length error” check	_____	20 points
A method exists to perform the “check total error” check	_____	20 points
A method exists to perform the “incomplete transmission” check	_____	20 points
A method exists to perform the encoding of the original message	_____	20 points
A method exists to perform the display of output	_____	20 points
Code uses try... catch for exception handling	_____	10 points
Code uses a consistent variable naming convention	_____	10 points

Total Points = 345