Problem #1: How much should I study outside of class?

Issue:

Your fellow students liked the study hour’s application so much they want to expand the program by adding the features listed below.

Study Hours per Week per Class Grade

15 A

12 B

9 C

6 D

0 F

Project Specifications:

The menu driven program has the following options:

1. Determine Hours to Study
2. Determine Grade
3. Quit

**ALGORITHM**

1. Display welcome screen
2. Present Menu options – repeat until option ‘C’ is selected:
   1. Option 1- Get name and score input
   2. Option 2 –Read file and display average
   3. Option 3 – Exit program
3. If Menu option A is entered:
   1. Check for file, appends blank file if not found
   2. Open and Read in data from a text file named *StudyHours.txt*
   3. The user corrects any bad data read from file.
   4. Accumulate number of students using program
   5. Accumulate credit hours taken
   6. The program determines the total weekly study hours (for all classes) per student.
      1. Classes = credit hours / 3
      2. Total weekly study hours = classes \* study hours per week per classes
      3. Accumulate study hours
   7. The program displays the user’s name, number of credits, expected total number of weekly study hours, and desired grade
   8. Close text file
   9. Return to step #2
4. If Menu option B is entered:
   1. Check for file, appends blank file if not found
   2. Open and Read in data from a text file named *Grades.txt*
   3. The user corrects any bad data read from file
   4. Accumulate number of students using program
   5. Accumulate credit hours taken
   6. Accumulate study hours
   7. The program determines the grade, assuming it’s the same grade for each class per student
      1. Total weekly study hours / classes = study hours per class

|  |  |
| --- | --- |
| Study Hours per Week per Class=Grade | |
| 15 | A |
| 12 | B |
| 9 | C |
| 6 | D |
| 0 | F |

* + 1. The program displays the user’s name, number of credits, total weekly study hours, and desired grade

1. If Menu option C is entered:
   1. Displays the total number of students from both *StudyHours.txt* and *Grades.txt*
   2. Calculate and Display the average credits taken
   3. Calculate Display the average study hours.
   4. Thanks the user for using the program
   5. Terminates the program

**VARIABLES/CONSTANTS**

VariableName Value (data type) functionName

beginSequence =’y’ str welcome()

userName = ‘’ str getName()

userScore =0 int getScore

menuOption =’’ str getMenuOption ()

STUDYHOURS = ’studyHours.txt’ str main()

AcreditTotal =0 int accumulateTotal()

AstudentCount =0 int accumuateCount()

AtotalStudyHours =0 int accumulateTotal()

studyHoursFile =’’ studyHours.txt’ file main()

userName =’’ str main()

creditHours =0 int main()

classes =0 int getNumofClasses()

grade =’’ str main()

studyHours =0 int getStudyHours()

TotalStudyHoursPerWeek =0 int getTotalStudyHoursPerWeek()

GRADES =’Grades.txt’ str main()

BcreditTotal =0 int accumulateTotal()

BstudentCount =0 int accumuateCount()

BtotalStudyHours =0 int accumulateTotal()

gradesFile =’Grade.txt’ file main()

studentName =’’ str main()

creditHoursB =0 int main()

classesB =0 int getNumofClasses()

studyHoursB =0 int main()

gradeB =0 int getGrade()

totalStudents =0 int main()

averageCredits =0 int main()

averageStudyHours =0 int main()

**FORMULAS**

* **totalStudents = (AstudentCount + BstudentCount)**
  + Calculate total number of students from both *StudyHours.txt* and *Grades.txt*
* **averageCredits = (AcreditTotal + BcreditTotal) / totalStudents**
  + Calculate the average credits taken
* **averageStudyHours = (AtotalStudyHours + BtotalStudyHours) / totalStudents**
  + Calculate the average study hours
* **classes = creditHours / CREDITSPERCLASS**
  + Calculate the number of classes taking
* **TotalStudyHoursPerWeek= classes \* studyHours**
  + Calculate the total number od study hours per week
* **studyhoursperclass = expecthoursofstudy / classesNum**
  + Calculate the study hours per class
* **countVariable +=1**
  + Accumulate formula for count
* **totalVariable += accVariable**
  + Accumulate formula for total

**HIERARCHY**

**FLOWCHARTS**

**Main() – see viso doc for magnified view**



**welcome()**



**getMenuOption(menuOption)**



**checkFile(validateFile)**



**validateName(userName)**



**accumuateCount(countVariable)**



**validateCreditHours(creditHours)**



**accumulateTotal(accVariable)**



**getNumofClasses(creditHours)**



**validateGrade(grade)**



**getStudyHours(grade)**



**getTotalStudyHoursPerWeek(classes, studyHours)**



**validateStudyHrs(studyHoursB, creditHoursB)**



**getGrade(classesNum, expecthoursofstudy)**



**TEST DATA**

**Grades.txt**

**Dez Bryant**

**~~-12~~ 12**

**36**

**Amari Cooper**

**12**

**48**

**Peyton Manning**

**~~\_\_~~ 18**

**~~150~~ 36**

**Marvin Harrison**

**18**

**90**

**Derrick Henry**

**6**

**24**

**StudyHours.txt**

**Barry Sanders**

**12**

**B**

**Brett Farve**

**6**

**c**

**Russel Wilson**

**~~21~~ 18**

**A**

**David Carr**

**3**

**d**

**Calvin Johnson**

**9**

**~~E~~ F**

**Grades.txt test data**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input  **Credit hours** | Input  **Study**  **Hours** | Process  **Student count** | Process  **Credit total** | | Process **Study Hour Total** | Process  **Classes** | | Process  **Grade** | **Output** | |
| **-~~12~~ 12** | **36** | **0+1=1** | **0+12=12** | | **0+36=36** | **12/3 = 4** | | **36/4= 9 = C** | **Dez Bryant**  **12**  **36**  **C** | |
| **12** | **48** | **1+1=2** | **12+12=24** | | **36+48=84** | **12/3 = 4** | | **48/4= 12 =B** | **Amari Cooper**  **12**  **48**  **B** | |
| **18** | **~~Xx~~ 36** | **2+1=3** | **24+18=42** | | **84+36=120** | **18/3 = 6** | | **36/6= 6 =D** | **Peyton Manning**  **18**  **36**  **D** | |
| **18** | **90** | **3+1=4** | **42+18=60** | | **120+90=210** | **18/3 = 6** | | **90/6= 15 =A** | **Marvin Harrison**  **18**  **90**  **A** | |
| **6** | **24** | **4+1=5** | **60+6=66** | | **210+24=234** | **6/3 = 2** | | **24/2= 12 =B** | **Derrick Henry**  **6**  **24**  **B** | |
|  |  |  |  | |  |  | |  |  |  |
| **Student count B** | | | | **Credit total B** | | | **Study Hour Total B** | | | |
| **5** | | | | **66** | | | **234** | | | |

**StudyHours.txt test data**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input  **Credit hours** | Input  **Grade** | Process  **Student count** | Process  **Credit total** | Process **Study Hour Total** | Process  **Classes** | Process  **Study Hours per week** | | Process  **Total study Hours** | **Output** | |
| **12** | **B** | **0+1=1** | **0+12=12** | **0+48=48** | **12/3 = 4** | **B = 12** | | **12 \*4 = 48** | **Barry Sanders**  **12**  **48**  **B** | |
| **6** | **c** | **1+1=2** | **12+6=18** | **48+18=66** | **6/3 = 2** | **C = 9** | | **9 \* 2 =18** | **Brett Farve**  **6**  **18**  **C** | |
| **~~21~~ 18** | **A** | **2+1=3** | **18+18=36** | **66+90=156** | **18/3 = 6** | **A = 15** | | **15 \* 6 = 90** | **Russel Wilson**  **18**  **90**  **A** | |
| **3** | **d** | **3+1=4** | **36+3=39** | **156+6=162** | **3/3 = 1** | **D = 6** | | **6 \* 1 =6** | **David Carr**  **3**  **6**  **D** | |
| **9** | **~~E~~ F** | **4+1=5** | **39+9=48** | **162+0=162** | **9/3 = 3** | **F = 0** | | **0 \* 3 = 0** | **Calvin Johnson**  **9**  **0**  **F** | |
|  |  |  |  |  |  |  | |  |  |  |
| **Student count A** | | | | **Credit total A** | | | **Study Hour Total A** | | | |
| **5** | | | | **48** | | | **162** | | | |

**Average Credit Hours and Study Hours Test Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Process  **Total Student count** | **Process**  **Average Credit Hours** | **Process**  **Average Study Hours** | **Output** |
| **5 + 5 = 10** | **48 + 66 =114**  **114/10=11.4** | **162 + 234 = 396**  **396 / 10 = 39.6** | **Total Students: 10**  **Average Credit Hours: 11.4**  **Average Study Hours: 39.6** |

**TEST DATA EXECUTION RESULTS**

#################################### TEST 1 ##################################

Hello Users!

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Thank you for taking the time to use this program.

The program was made by Jeremy Bargy.

Last update March 2020

Instructions

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The program being used is designed to help students identify their study needs for this semester.

With this information, students can build and develop their own study habits to meet their academic goals.

Begin program?

Please enter Y for yes

y

Select A -- Determine Hours to Study.

Select B -- Determine Grade.

Select C -- Display Totals and End the Program.

a

Student Name: Barry Sanders

Credit Hours: 12

Study Hours Recommended: 48.0

Desired Grade: B

Student Name: Brett Farve

Credit Hours: 6

Study Hours Recommended: 18.0

Desired Grade: C

Error: incorrect credit hours input

---------------------------------------

Please enter the credit hours you are currently enrolled in. i.e. Must be between 1 and 6 classes. Or as required, 3 - 18 credit hours.

18

Student Name: Russel Wilson

Credit Hours: 18

Study Hours Recommended: 90.0

Desired Grade: A

Student Name: David Carr

Credit Hours: 3

Study Hours Recommended: 6.0

Desired Grade: D

Error: incorrect grade input

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Please enter the grade you wish to earn:

f

Student Name: Calvin Johnson

Credit Hours: 9

Study Hours Recommended: 0.0

Desired Grade: F

Select A -- Determine Hours to Study.

Select B -- Determine Grade.

Select C -- Display Totals and End the Program.

b

Error: incorrect credit hours input

---------------------------------------

Please enter the credit hours you are currently enrolled in. i.e. Must be between 1 and 6 classes. Or as required, 3 - 18 credit hours.

12

Student Name: Dez Bryant

Credit Hours: 12

Study Hours Allocated: 36

Possible Grade Earned: C

Student Name: Amari Cooper

Credit Hours: 12

Study Hours Allocated: 48

Possible Grade Earned: B

Error: incorrect credit hours input

---------------------------------------

Please enter the credit hours you are currently enrolled in. i.e. Must be between 1 and 6 classes. Or as required, 3 - 18 credit hours.

18

Error: incorrect study hours input

---------------------------------------

Please enter in a positve number for your study hours that is more than your credit hours.

Do not excced 125. You still need time to rest! :

36

Student Name: Peyton Manning

Credit Hours: 18

Study Hours Allocated: 36

Possible Grade Earned: D

Student Name: Marvin Harrison

Credit Hours: 18

Study Hours Allocated: 90

Possible Grade Earned: A

Student Name: Derrick Henry

Credit Hours: 6

Study Hours Allocated: 24

Possible Grade Earned: B

Select A -- Determine Hours to Study.

Select B -- Determine Grade.

Select C -- Display Totals and End the Program.

c

Program Averages:

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Total Students: 10

Average Credit Hours: 11.4

Average Study Hours: 39.6

Thanks for using our program!

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