

AP Computer Science
Summer Work 2020 - 2021
Mrs. Kaelin
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Welcome future 2020 – 2021 AP Computer Science Students! I am so excited that you have decided to embark on this journey with me. Learning how to code is equivalent to learning a foreign language. It takes dedication and acceptance that you will make mistakes along the way. Traditionally, students with an interest in careers related to: business, engineering, computer science, information technology, bioinformatics, genetics, physics, chemistry, or math should take AP Computer Science. However, in today's world, almost every occupation or endeavor uses some form of computer software including the fine arts. Some knowledge about how software is designed, created, and maintained will provide useful background.

There are two parts to this summer assignment. The first is to ensure that each student has the ability to compile and run code on a computer system at home. We will be doing a lot of coding during the school year in class, but there will be times when it is necessary to do work outside of the computer lab. The second part is to introduce you to the Java programming language. The summer assignment is equivalent to a test grade, so it is extremely important to complete it and turn it in on Friday, August 14th, of the first week of school. Summer work that is not completed and turned in will count as a 0%.

By signing below, the student and parent(s)/guardian recognizes that this is a college level course in computer science. AP Computer Science A is a demanding class and success depends on ability, development of prerequisite skills, and a willingness to study. Advanced Placement classes require more study time than the typical high school class and this course runs on an accelerated schedule. The requirements for the AP test are covered prior to the exam that is administered on May 6, 2021.

Student Name(printed)

Student Signature

Parent Signature

Today's Date

ALL ASSIGNMENTS ARE DUE NOT LATER THAN FRIDAY, AUGUST 14TH, 2020. NO LATE WORK ACCEPTED!!!!

ASSIGNMENT #1: The cover sheet signed and dated by you and your parent.

ASSIGNMENT #2: You will need to install Java onto a computer at home.

Step 1: Download Java(it needs to be the JDK form). See the attached pages for the instructions.

Step 2: Once Java is installed, screen print the install complete messages for Java JDK. For windows, hit the PrntScrn key. You will then need to open a word document and select paste. On a mac, press Apple key ⌘ + Shift + 3. The screen shot will appear on your desktop. Please attach the screen print to this packet.

ASSIGNMENT #3: You will need to install BlueJ onto a computer at home.

Step 1: Download BlueJ. See the attached pages for the instructions.

Step 2: Once BlueJ is installed, screen print the install complete message. For windows, hit the PrntScrn key. You will then need to open a word document and select paste. On a mac, press Apple key ⌘ + Shift + 3. The screen shot will appear on your desktop. Please attach the screen print to this packet.

ASSIGNMENT #4: Sign up for remind messages. See attached instructions.

ASSIGNMENT #5: It is time to start learning some key words used in Java. Do an online search and try to define as many of these words as you can. Please define these words on a separate piece of paper.

Key Vocabulary Words

- | | |
|----------------------------|------------------------|
| 1. instance variables | 2. objects |
| 3. classes | 4. recursive methods |
| 5. methods | 6. top-down approach |
| 7. while loop | 8. local variables |
| 9. one-dimensional arrays | 10. arrayList |
| 11. two-dimensional arrays | 12. if-else statements |
| 13. for-loop | 14. public |
| 15. private | 16. static |
| 17. compile | 18. syntax |

ASSIGNMENT #6: Visit www.collegeboard.org and find the **AP Computer Science A** home page. Open the course description and read the section on the exam. Answer the attached questions regarding the exam. Please feel free to read any other section of the course description.

ASSIGNMENT #7: In Java, there are two statements used to print output. They are:

1. `System.out.print( );`
2. `System.out.println( );`

The () will eventually be filled in with the output we want Java to give us. Please write each statement 20 times, by hand. It is necessary that you memorize these statements as they will be included in every code that you write.

ASSIGNMENT #8: In Java, any code that is written begins executing at the following statement:

```
public static void main(String [] args) {
```

Please write this statement 20 times, by hand. It is necessary that you memorize this statement as it will be included in every code that you write.

ASSIGNMENT #9: The way we divide numbers is different than the way Java divides numbers. When writing codes that deal with numerical data, you will need to let Java know if the data is an integer value (-5, -8, 8, 0, 10, etc.) or a double value (6.5, 7.2 -1.45, 0.98, etc.). If we divide any combination of these types of numbers in our calculator, the calculator will return a decimal answer if necessary. In Java, the decimal part will only be returned in certain combinations. Read the Assignment #9 Worksheet and then complete the practice exercises. **You will have a quiz on August 14, 2020 covering this material.**

ASSIGNMENT #10: In Java, there are 6 common operators used to perform algebraic expressions. Complete Worksheet #10 to learn what the common operators are, how they work, and what order they are performed. Yes, Java must follow order of operations but the order is slightly different than what you have been taught in your math classes. **You will have a quiz on August 14, 2020 covering this material.**

ASSIGNMENT #11: Purchase a USB flash drive and bring with you on the first day of school. This is optional if you have other ways to transfer in class work to home if necessary.

ASSIGNMENT #12: Please plan on attending AP Boot Camp. This date is TBD based on the district's decision about opening school in August. If you do not follow the school or Mrs. Cortier on Twitter, consider doing so. This is how to stay informed of important dates, events, and updates(@JWMHS, @JWMHS_cortier).

APCS
SUMMER WORK CHECKLIST AND GRADING RUBRIC

Directions: Use this checklist to help you organize your summer assignments. Staple all work to this checklist in assignment number order. **Failure to do so will result in a loss of 25 points. Please turn these assignments in no later than Friday, August 14, 2020. NO LATE WORK ACCEPTED!**

Assignment	Total points worth	Total points earned (to be completed by Mrs. Kaelin)	Comments(to be completed by Mrs. Kaelin)
1. Cover sheet with student and parent signatures	5		
2. Screen shot of Java installation completed	5		
3. Screen shot of BlueJ installation completed	5		
4. Remind 101 sign-up. This will be verified through remind101.	5		
5. Vocabulary Words defined	16		
6. APCS Exam Information Worksheet completed	10		
7. Print statements written 20 times each by hand	20		
8. Line of execution written 20 times by hand	10		
9. Java and Division worksheet completed	18		
10. Java and Order of Operations Worksheet	26		

_____ points / 120 points

_____ %

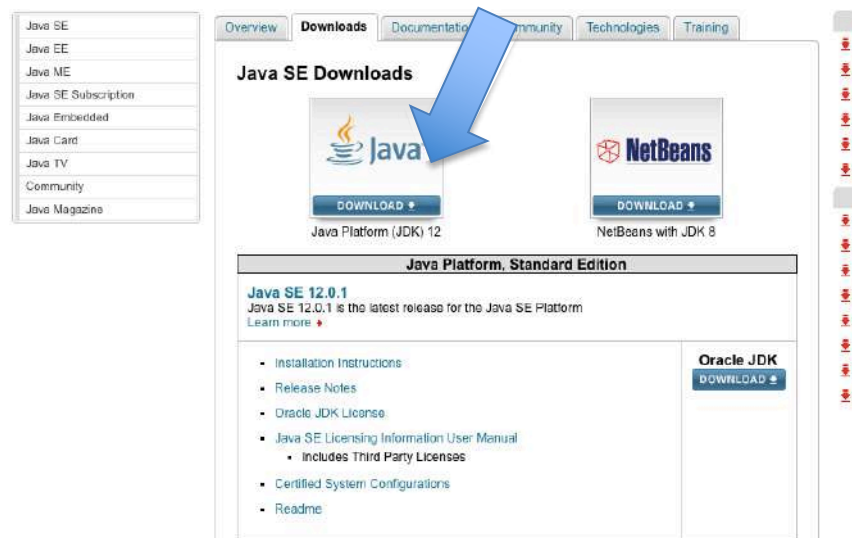
APCS Summer Work: Assignment #2

Installing Java

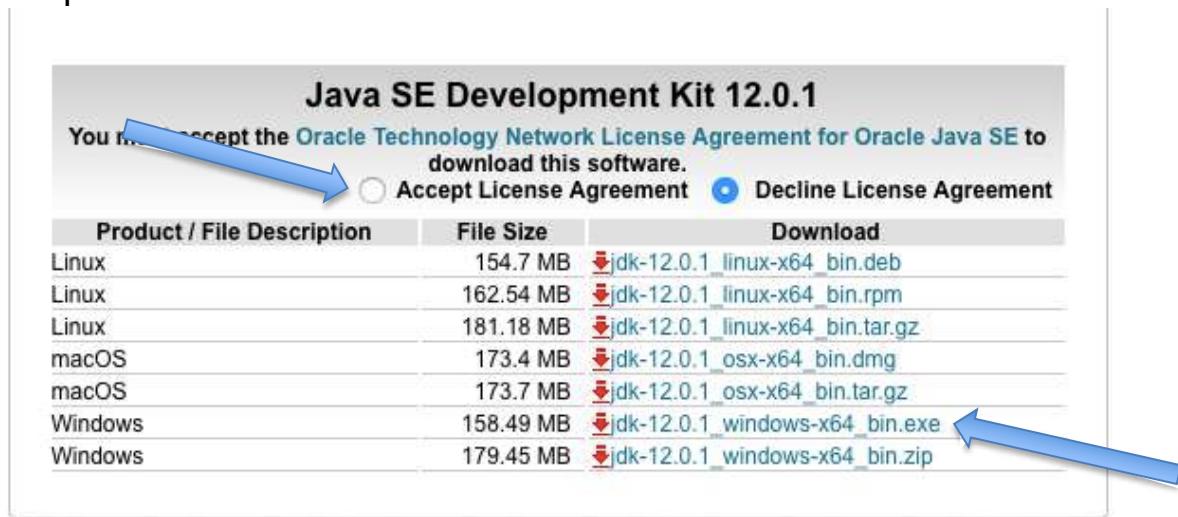
Follow these instructions to install Java on your home computer. Please note that all computers are different so don't be surprised if you have to make some adjustments during the installation process. In those situations, accept any default choices that Windows makes for you.

Step 1: Download Java

- Go to the Java Download(<http://java.sun.com/javase/downloads/index.jsp>) section of the Sun Microsystems/Oracle website.
- Choose Java Platform (JDK) 12



Step 2: Accept License Agreement and click the Windows x64 link. Java should be preinstalled on the Mac.



Step 3: Follow the remaining instructions to complete download. Do not download anything additional or change the destination folder of the download. At the end of the download it will ask you to create an account. DO NOT CREATE AN ACCOUNT.

APCS Summer Work: Assignment #3

Installing BlueJ

Follow these instructions to install BlueJ on your home computer. Please note that all computers are different so don't be surprised if you have to make some adjustments during the installation process. In those situations, accept any default choices that Windows makes for you.

Step 1: Go to the [BlueJ web site](http://bluej.org/) (<http://bluej.org/>)

BlueJ

A free Java Development Environment designed for beginners, used by millions worldwide. [Find out more...](#)

"One of my favourite IDEs out there is BlueJ"
— James Gosling, creator of Java.

Created by 



Supported by 

Step 2: Download and install the version that works best for your computer. Make sure you install the JDK version.

Download and Install

Version 4.2.1, released 30 April 2019 (fixes startup freeze, changed-on-disk dialog, [and more](#))

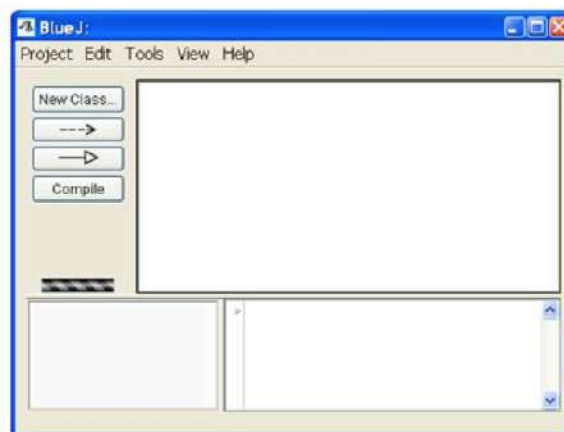
Windows	Mac OS X	Ubuntu/Debian	Other
			
Requires 64-bit Windows, Windows 7 or later. Also available: Standalone zip suitable for USB drives.	Requires OS X 10.11 or later.	Requires 64-bit, Debian buster or Ubuntu 18.10 or later. Please read the Installation instructions .	Please read the Installation instructions . (Works on most platforms with Java/JavaFX 11 support).

The automated installer will take over from here. If any decisions need to be made, accept the default recommendations. This usually simply involves selecting Next through a series of windows and then Finish when the download and installation are complete.

When installation is complete a BlueJ shortcut icon will appear on your desktop.



Double-click on the BlueJ shortcut icon to make sure the program launches correctly. You should see something similar to the following screen shot.



APCS Summer Work: Assignment #4

Sign up for Remind



Sign up for important updates from Mrs. Kaelin.

Get information for **James W. Mitchell High School** right on your phone—not on handouts.

Pick a way to receive messages for **APCS 20-21**:

A If you have a smartphone, get push notifications.

On your iPhone or Android phone, open your web browser and go to the following link:

rmd.at/bfk8gf

Follow the instructions to sign up for Remind. You'll be prompted to download the mobile app.

A smartphone screen displaying the Remind sign-up page. The address bar shows "rmd.at/bfk8gf". The page title is "Join APCS 20-21". There are two input fields: "Full Name" with the placeholder "First and Last Name", and "Phone Number or Email Address" with the placeholder "(555) 555-5555".

B If you don't have a smartphone, get text notifications.

Text the message [@bfk8gf](https://t.me/bfk8gf) to the number **81010**.

If you're having trouble with **81010**, try texting [@bfk8gf](https://t.me/bfk8gf) to **(229) 471-4203**.

* Standard text message rates apply.

A smartphone screen showing a text message interface. The "To" field contains the number "81010". The "Message" field contains the text "@bfk8gf".

Don't have a mobile phone? Go to rmd.at/bfk8gf on a desktop computer to sign up for email notifications.

APCS Summer Work: Assignment #6
APCS Exam Information Worksheet

1. How many sections are on the exam? How many questions are in each section? How long is given for each section?

2. What must you be able to demonstrate on both sections of the test?

3. Multiple choice questions on the exam are classified according to the type of content. What are the seven categories tested in the multiple- choice section of the exam?

4. Explain how the multiple-choice section is scored (including when points are and are not awarded).

APCS Summer Work: Assignment #9

Dividing Numbers in Java Worksheet - **You will have a quiz on August 16th covering this material.**

Division in Java is a little trickier than division on a calculator. Numbers in Java are separated into two types: an `int` or a `double`. When working with numbers in Java, you will need to declare how Java is to use a number.

Examples of <code>ints</code>	Examples of <code>doubles</code>
• 5 • -10 • 2 • 0 • 100 • -1345	• 0.67 • 2.35 • -1.2 • 10.0 • 0.0234 • 5.5

There are three combinations of division in Java:

1. an `int` by an `int`
2. an `int` by a `double` or a `double` by an `int`
3. a `double` by a `double`

Dividing an `int` by an `int` in JAVA:

- $10 / 2 = 5$
- $10 / 3 = 3$
- $15 / 6 = 2$
- $5 / 3 = 1$

In Java, when you divide two `ints`, an `int` is returned and it is not rounded. For example, $10 / 3$ on a calculator would give 3.333333... but in Java, the language truncates the answer and only returns the integer part so $10 / 3 = 3$ in Java.

Dividing an `int` by a `double` or a `double` by an `int` in JAVA:

- $10.0 / 2 = 5.0$
- $10.0 / 3 = 3.333$
- $15 / 6.0 = 2.5$
- $5 / 3.2 = 1.5625$

In Java, when you divide an `int` by a `double` or a `double` by an `int`, a `double` is returned and it is not rounded. We will learn how to round decimal answers but for now your job is to understand how java handles this situation.

Dividing a double by a double in JAVA:

- $6.0 / 2.0 = 3.0$
- $8.25 / 2.24 = 3.68303571$

In Java, when you divide a double by a double, a double is returned and it is not rounded.

PRACTICE PROBLEMS: Now it is your turn to try and perform division that way Java performs division. Use the rules that you just reviewed!

Divide each set of numbers using the rules of Java.		
7 / 6.0	36 / 6	12.2 / 5.4
32 / 8.0	23 / 7	16.0 / 4.0
23.4 / 2.5	12 / 5	12.0 / 5
100 / 24	43 / 8	44.5 / 3.6
(3 + 5 + 7) / 5.0	(2.4 + 6.1) / (8.2 - 7.5)	(6 - 10 - 8) / (1 + 3 + 2)
44.2 / 2	44.2 / 2.0	44 / 2.0

APCS Summer Work: Assignment #10

Order of Operations in Java - **You will have a quiz on August 16th covering this material.**

The following table displays the 6 operators in Java and their order of precedence when evaluating arithmetic expressions:

Operator	Symbol	Precedence(H to L)	Comments
Grouping	()	1	As in math class, grouping is performed first. Parenthesis can be used to change the order of evaluation.
Multiplication	*	2	Evaluated before addition or subtraction.
Division	/	2	Evaluated before addition or subtraction.
Modulus	%	2	Modulus returns the remainder of integer division. Evaluated before addition or subtraction.
Addition	+	3	Last to be performed unless contained in parenthesis.
Subtraction	-	3	Last to be performed unless contained in parenthesis.

- Multiplication in java can only be coded with a *.
- If an expression contains operators of the same precedence only, then the expression is evaluated from left to right.
- If an expression contains mixed operators but have multiple operators of the same precedence, perform the same level of precedence operators from left to right.

Now, let's take a closer look at the modulus operator. Again, modulus tells Java to return the **remainder** of integer division.

For example:

1. $10 \% 3 = 1$ however, $10 / 3 = 3$
2. $12 \% 5 = 2$ however, $12 / 5 = 2$
3. $42 \% 7 = 0$ however, $42 / 7 = 6$
4. $9 \% 5 = 4$ however, $9 / 5 = 1$

Find the quotient or modulus of each expression.		
$15 \% 4$	$15 / 6$	$22 \% 3$
$32 / 6$	$40 \% 12$	$23 / 4.0$
$25 \% 4$	$16.0 / 5.0$	$80 / 13$
$50 \% 3$	$17 \% 7$	$17 / 7$

All the problems above were performing division when the dividend is larger than the divisor. What if we make the dividend smaller than the divisor? What would the quotient and remainders be in this situation?

Find the quotient or modulus of each expression.		
$4 / 15$	$6 \% 15$	$3 \% 22$
$6 / 32$	$12 \% 40$	$10 / 15$

1. What was the quotient when the dividend was smaller than the divisor?
2. What was the remainder when the dividend was smaller than the divisor?

Let $w = 15$, $x = 9.2$, $y = 7$, and $z = 1.24$. Simplify the following expressions.		
$(w + y) / x$	$w \% y$	$w \% y * z - x$
$y * y + y \% w$	$(x / z - w) + x$	$x / z * y$