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Algorithm to check prime number in c

People have Social Security numbers. Cities and towns have zip codes. Banks have routing numbers, bank account numbers and check numbers. They're sometimes referred to as ABA routing numbers, routing transit numbers or simply as RTNs. The routing number identifies the bank where the account was opened, as well as its location. It is this number that sets it apart from all the other financial institutions out there. ABA stands for the American Banker's Association, which developed the routing number system in 1910 and still oversees it today. Banks need ID numbers to avoid chaos, confusion and mistakes when funds that have been placed on deposit with them are transferred from one institution to another, such as when someone writes a check for payment. The Federal Reserve Bank requires that the bank's name, as well as its city and state location, also appear on paper checks in addition to the bank's routing number. The paying bank must be clearly identified. This makes sense when you think about it. Fewer and fewer people use paper checks these days, but literally billions of them have nonetheless been written in the last decade. The federal government and the ABA want to make absolutely sure that the money comes out of your account and no one else's when you remit $150 to your electric company for this month's service. Most checks are electronically processed these days, even the paper kind. Scanners literally snap pictures of the front and back of checks to identify transactions. Assuming the money is there and available in your checking account, that image will facilitate an electronic debit of that $150 from your bank account and transfer it to your electric company's account. The routing number on your check guides this process to the correct bank, not to one with a similar or the same name in another state. Read More: Step-by-Step: How to Write a Check A bank's routing number is composed of nine digits. These numbers work together to clearly identify the bank, as well as the location where the account was opened and is being held. Joe's Bank in Omaha might have a routing number of 123456789. Joe's Bank in Topeka would be differentiated with a routing number of 123456710. The last two digits are different because the branches are in different states. One bank can have multiple routing numbers if it has more than one location, each number identifying a certain branch. The routing number works in conjunction with your account number to clearly identify where the money is to be transferred from. Routing numbers work in reverse as well. They identify the account into which the money is supposed to be deposited after it leaves your account. Routing numbers aren't reserved only for old-fashioned paper checks. They facilitate electronic transfers of money as well. You'll certainly be asked for it, along with your account number, if you're trying to pay that electric bill online or over the phone. You'll need it if you set up automatic debits from your account to pay recurring monthly bills. And you'll have to give it to your employer if your paychecks are issued to you by direct deposit so the company knows where to send your money. Mobile payment services like Venmo and PayPal also require a routing number if you want to transfer money to a family member or friend, and wire transfers require this identifier as well. Maybe you gave up on paper checks years ago, and now you're trying to pay that electric bill online. You've accessed your account with the utility company. And there it is, that blank box you're supposed to fill in, right after the blank box that calls for your account number. It wants you to enter your bank's routing number. Not a problem. Banks' routing numbers aren't highly classified information. They're not confidential. Banks are more than glad to share theirs with you. Open another tab in your browser and access your bank's website. The bank's routing number should be posted somewhere on there, even if not clearly in neon. You can do the same type of search from your smartphone if you need the routing number when you're on the go. Sometimes you might have to hunt a little, however. For example, U.S. Bank's website requires that you click on the "I'd like to…" tab on your transactions page to get the number. Wells Fargo Bank and Bank of America offer search tools on their website that let you find your branch location and the appropriate corresponding number. Many banks post their routing numbers on their "account information" or "account summary" pages. Read More: Advantages and Disadvantages of Internet Banking Another very easy way of tracking a routing number down is to simply call your bank and ask a customer service representative for it, but this carries a chance for error because mistakes might be made in the translation. You might think the representative said five when, in fact, they said nine. You might nonetheless take this route if you simply want to confirm a number you found on an unrelated website online. And yes, they're out there, too. Some websites post routing numbers for all major banks. And if you do happen to have paper checks on hand, the routing number will appear at the bottom of the check on the left side, next to your account number. It might not be labeled as "routing number," but remember, you're looking for nine digits. You might simply see those nine digits, or the number might appear as 12 digits with the first three of them being zeroes. Unfortunately, you might encounter one more hiccup in the process of nailing down the correct routing number for your bank. Just as banking institutions have different numbers for each of their branches or locations – and some national banks have multitudes of branches – some also often have different numbers depending on the type of transaction you're attempting to authorize. This isn't uncommon. Banks often do draw a line between wire transfers, ACH or automatic clearing house transfers and other types of payments. But the same routing number is ordinarily – although not always – used for electronic payments, direct deposits and paper checks. It's usually just wire transfers that are set apart from the rest. Read More: Can a Wire Transfer Bounce? Finally, some entities that simply handle transactions for banks have their own numbers, too, but they're not routing numbers. They're referred to as "electronic transfer identifiers," or ETIs. And ECIs, or traveler's check identifiers, are used just by payers of traveler's checks. The one thing you can count on, however, is that no two banking institutions will share the same number. If you only vaguely remember your elementary school mathematics class, you may not remember what a prime number is. That's a pity, because if you're trying to keep your emails safe from hackers or surf the web confidentially on a virtual private network (VPN), you're using prime numbers without even realizing it.That's because prime numbers are a crucial part of RSA encryption, a common tool for protecting information, which uses prime numbers as keys to unlock the messages hidden inside gigantic amounts of what's disguised as digital gibberish. Additionally, prime numbers have other applications in the modern technological world, including an important role in defining the color intensity of the pixels on the computer screen that you're staring at now.So, what are prime numbers, anyway? And how did they get to be so important in the modern world?As Wolfram MathWorld explains, a prime number – also known simply as a prime – is a positive number greater than 1 that can only be divided by the one and itself."The only even prime number is 2," explains Debi Mink, a recently retired associate professor of education at Indiana University Southeast, whose expertise includes teaching elementary mathematics. "All the other primes are odd numbers."Numbers like 2, 3, 5, 7, 11, 13 and 17 are all considered prime numbers. Numbers like 4, 6, 8, 9, 10 and 12 are not.Mark Zegarelli, author of numerous books on math in the popular "For Dummies" series who also teaches test prep courses, offers an illustration involving coins that he uses with some of his students to explain the difference between primes and composite numbers, which can be divided by other numbers besides one and themselves. (Composite numbers are the opposite of primes.)"Think about the number 6," says Zegarelli, citing a composite number. "Imagine that you have six coins. You could form them into a rectangle, with two rows of three coins. You can do that with eight, too, by putting four coins into two rows. With the number 12, you could make it into more than one type of rectangle — you could have two rows of six coins, or three times four. ""But if you take the number 5, no matter how you try, you can't put it into a rectangle, " Zegarelli notes. "The best you can do it is string it into a line, a single row of five coins. So, you could call 5 a non-rectangular number. But the easier way to say that is to call it a prime number. "There are plenty of other primes — 2, 3, 7 and 11 also are on the list, and it keeps rolling from there. The Greek mathematician Euclid, back in circa 300 B.C.E., devised a Proof of the Infinitude of Primes, which may have been the first mathematical proof showing that there is an infinite number of primes. (In ancient Greece, where the modern concept of infinity wasn't quite understood, Euclid described the quantity of primes simply as "more than any assigned multitude of prime numbers.")Another way of understanding primes and composite numbers is to think of them as the product of factors, Zegarelli says. "2 times 3 equals 6, so 2 and 3 are factors of 6. So, there are two ways to make six — 1 times 6, and 2 times 3. I like to think of them as factor pairs. So, with a composite number, you have multiple factor pairs, while with a prime number, you have only one factor pair, the times the number itself. "Proving that the number of primes are infinite isn't that tough, Zegarelli says. "Imagine that there is a last, biggest prime number. We're going to call it P. So then I'll take all the prime numbers up to P and multiply them all together. If I do that and add one to the product, that number has to be a prime. "If a number is a composite, in contrast, it's always divisible by some quantity of lower prime numbers. "A composite could be divisible by other composites as well, but eventually, you can decompose it down to a set of prime numbers. " (An example: the number 48 has 6 and 8 as factors, but you can break it down further into 2 times 3 times 2 times 2 times 2.)So why have primes held such fascination among mathematicians for thousands of years? As Zegarelli explains, a lot of higher mathematics is based upon primes. But there's also cryptography, in which primes have a critical importance, because really large numbers possess a particularly valuable characteristic. There's no quick, easy way to tell if they're prime or composite, he says.The difficulty of discerning between huge primes and huge composites makes it possible for a cryptographer to come up with huge composite numbers that are factors of two really big primes, composed of hundreds of digits."Imagine that the lock on your door is a 400-digit number," Zegarelli says. "The key is one of the 200-digit numbers that was used to create that 400-digit number. If I've got one of those factors in my pocket, I've got the key to the house. " But if you don't have those factors, it's pretty darn tough to get in.That's why mathematicians have continued to labor to come up with increasingly bigger primes, in an ongoing project called the Great Internet Mersenne Prime Search. In 2018, that project led to the discovery of a prime number that consisted of 23,249,425 digits, enough to fill 9,000 book pages, as University of Portsmouth (England) mathematician Ittay Weiss described it in The Conversation. It took 14 years of computations to come up with the gigantic prime, which is more than 230,000 times bigger than the estimated number of atoms in the observable universe!You can imagine how impressed Euclid might be by that.Now That's CoolThough many have believed that primes are random, in a 2016 paper, two Stanford University mathematicians described a previously unknown apparent pattern, in which primes tended to be followed by other primes ending in certain digits, as this Wired article details. For example, among the first billion prime numbers, a prime ending in 9 is about 65 percent more likely to be followed by a prime ending in one than it is to be followed by a prime ending in nine. Keep up with the latest daily buzz with the BuzzFeed Daily newsletter! 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 are all prime numbers and they hold special significance. Mathematicians from ancient times to the 21st century have been working on prime numbers, as they're one of the most mysterious and important subjects in mathematics. In this course, I will present several attractive topics on prime numbers. You will learn basic concepts of prime numbers from the beginning. They obey mysterious laws. Some laws are easily verified by hand, some laws were discovered 100 years ago, and some laws are yet to be discovered. Surprisingly, prime numbers are also applied to cryptography today. You will also learn how to construct practical cryptosystems using prime numbers. The original course "Fun with Prime Numbers" was first offered in 2015 and attracted many students. This course will be offered as its refined and upgraded version. All the lecture videos will be renewed, and a new topic on cryptography will be added so as to enliven and satisfy even the students who took the previous course. No previous knowledge of prime numbers is required in this course. Calculating with a pen and paper, you will explore the mysterious world of prime numbers. The course is designed to encourage you to attack unsolved problems, and hopefully, discover new laws of your own in the future! Basic Properties of Prime Numbers Modular Arithmetic and Fermat's Little Theorem Laws of Prime Numbers Applications of Prime Numbers to Cryptography Open Problems and Recent Advances Week1: What are Prime Numbers? Introduction to basic concepts and properties of prime numbers, such as infinitude of prime numbers, counting prime numbers, and the Basel problem and its relation with the Riemann Hypothesis. Week 2: Sums of Two Squares Introduction to the modular arithmetic and its applications to number theory, including Fermat's Little Theorem, Wilson's Theorem, and Fermat's theorem on sums of two squares. Week 3: The Reciprocity Laws Introduction to the quadratic reciprocity laws proved by Gauss. Several generalizations of the quadratic reciprocity laws are also explained. Week 4: Prime Numbers and Cryptography Introduction to cryptography, and the construction practical cryptosystems using prime numbers. More recent topics on elliptic curve cryptosystems are also explained. Week 5: Mystery of Prime Numbers: Past, Present, and Future Introduction to several open problems and conjectures on prime numbers, including the Birch and Swinnerton-Dyer conjecture and the ABC conjecture.Kyoto UniversityReceive an instructor-signed certificate with the institution's logo to verify your achievement and increase your job prospectsAdd the certificate to your CV or resume, or post it directly on LinkedInGive yourself an additional incentive to complete the courseedX, a non-profit, relies on verified certificates to help fund free education for everyone globally"I very much liked the way the course catered for a wide range of mathematical abilities. Very capable participants could get most from the lectures. Those, like myself, with lesser ability could get a lot from the quizzes and homework. A splendid course that does not need any improvement."