

51. Internet and Email

Classroom Activity: A simulation designed to show the underlying structure and methods of communication on the Internet.

Grade(s): 11 and 12

Course(s) and Strand (s): Business Studies

Information and Communication Technology: The Digital Environment, Grade 11 Open

Strand: Digital Literacy

Information and Communication Technology: Multimedia Solutions, Grade 12 College

Strand: The Electronic Business Environment

Relevant business studies expectations for this activity can be found in the supplementary Ontario curriculum alignment document: Ontario Curriculum Alignment for Engineer-in-Residence Secondary Classroom Activities: Science and Technological Education

Course(s) and Strand(s): Technological Education

Computer Engineering Technology, Grade 11 University/College

A. Computer Technology Fundamentals

Computer Engineering Technology, Grade 12 University/College

A. Computer Technology Fundamentals

See supplementary document Ontario Curriculum Alignment for Engineer-in-Residence Secondary Classroom Activities: Science and Technological Education for relevant technological education overall and specific expectations.

Time needed to complete this activity: 60 minutes

Materials/Resources for students: no additional materials required

Activity Description:

Introduction to the Internet and email. If possible and appropriate for your grade level explain the history of the Internet from its development as a communications system with no central authority that would be difficult to disrupt by hostile forces. The Internet was conceived and developed out of necessity by the Americans during

the Cold War.

Stage one - basic email delivery.

This stage answers the question: How does the mail get through when the place you are sending it from doesn't know where the final destination is?

Give each student a list of destinations or rules for delivery. The attached is suitable for higher grades, at lower grades the actual student name would be preferable. Since I was doing four classes I decided to simplify my part of the task.

The rules for delivery are this:

First, you may only deliver an email message that is addressed to someone who is on your list. Such a message can be taken directly to that student's desk and becomes a completed delivery.

Second, if the address is not on your list, then deliver the message to the first name on your list.

Do a couple of trial runs. Start with any message and the rules for any student. Check if the message can be delivered, if not have the student walk the message over to the first address on his/her list. Check with that student if the address is on the list. If yes, deliver, if no send to the next person. Depending on the situation the number of hops can vary from 1 to 6 or 7.

Once you think the students understand, give each one a number of messages (2-5) to be delivered and let them loose.

You can expect chaos for awhile and a number of students will be confused and need some extra direction. After one or two assisted deliveries usually everyone gets it. This works fine if, and only if, everyone is there. If someone is absent then complications arise. Here is how to handle them.

First their mail can not be delivered. In this case the person who is trying to deliver the message should hang on to the message until the end of the round. This is the same as the Internet where nodes will hold messages for specified periods of time and will retry delivery at regu-

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lar intervals.

Second, they will appear as the address on one person's list as the place to send all mail that is not understood. In this situation the person who can not deliver to the absent person should send all non-understood address mail to the second person on the list.

Variations on this process.

If everyone is there, take one person out, and simulate one or two messages without that person/node in the net. Add a new address. This address can be added to one person's delivery list. Start a message from anywhere else and it will get there. This is similar to you giving out our email address to someone around the world and they send a new message. Stage 2 - This stage adds considerable complication to the process. I have tried this with Grade 9's and it was pretty well understood by most students, though there were a few that really didn't get it. This simulation stage is used to simulate how the internet "learns". If stage 1 delivery were to continue as the network grows the volume of mail would quickly become intolerable, as each mail message would be handled a large number of times. After you have run stage 1, you can try stage 2. For this simulation you will need the extra piece of paper for each student, see sample attached, that allows the student to add new addresses and change those new entries. Run a few demos of this one, because it is quite tricky. Take any student and any message. Can the message be delivered directly, according to the rules in stage 1? If yes, OK, but if no, take the message.

to the first address on your rules list. Leave the message there, but now look at the rules for that person. Can that person deliver it directly? If yes, go back to your desk and complete the form (samples below). If no, note the address that that person would deliver the message to, go back to your desk and complete the form.

Sample form was:

For _____ send message to
_____, _____, _____.

Imagine the following example.

Delta has to deliver a message to Foxtrot, but Foxtrot is not on his/her list.

Instead Mike is the first address on his/her rules list.

Delta goes to Mike's desk and looks at his/her rules.

Case 1, Mike has Foxtrot on his/her list.

The form would be completed as:

For _Foxtrot_____ send message to _Fox-
trot_____, _____, _____.

Case 2, Mike does not have Foxtrot on his/her list, and Romeo is the alternate address.

The form would be completed as:

For __Foxtrot_____ send message to
_Romeo_____, _____, _____.

Tips:

This activity worked in perfectly with Unit 3 of the Business Technology course for Grade 9's. In fact the curriculum suggests just such an activity but is extremely vague about how the messages should be passed around the class. This simulation provides exactly the structure necessary while still simulating the real world.

There will be chaos in the class during each simulation. Students and teachers should take note of this because it displays very well the chaos in the real Internet.

Be prepared for lots of questions!

If possible provide introductory or closing remarks about the students real world use of the Internet, email, IRC/ICQ, the web, etc. Whether the data packet is an email message or a chunk of a web page the same basic process is used. For example when you type a new web page address, for the first time, in your browser your local ISP (or web server) may not understand the address and change it into IP form.

So what happens? Your local ISP goes to his/her designated alternate and checks there. If they still don't know they go to another alternate, etc. Ultimately someone out there knows the new address and can interpret it.

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26 Students

ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL
<i>JULIETTE</i>	<i>KILO</i>	<i>LIMA</i>	<i>MIKE</i>	<i>NOVEMBER</i>	<i>OSCAR</i>	<i>PAPA</i>	<i>QUEBEC</i>
SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE	ZULU
PAPA	QUEBEC	ROMEO	SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY
X-RAY	YANKEE	ZULU	ALPHA	BRAVO	CHARLIE	DELTA	ECHO
HOTEL	INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER	OSCAR
DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE	KILO

INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA
<i>ROMEO</i>	<i>SIERRA</i>	<i>TANGO</i>	<i>UNIFORM</i>	<i>VICTOR</i>	<i>WHISKEY</i>	<i>X-RAY</i>	<i>YANKEE</i>
ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL
X-RAY	YANKEE	ZULU	ALPHA	BRAVO	CHARLIE	DELTA	ECHO
FOXTROT	GOLF	HOTEL	INDIA	JULIETTE	KILO	LIMA	MIKE
PAPA	QUEBEC	ROMEO	SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY
LIMA	MIKE	NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO	SIERRA

QUEBEC	ROMEO	SIERRA	TANGO	UNIFORM	VICTOR
<i>ZULU</i>	<i>ALPHA</i>	<i>BRAVO</i>	<i>CHARLIE</i>	<i>DELTA</i>	<i>ECHO</i>
INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER
FOXTROT	GOLF	HOTEL	INDIA	JULIETTE	KILO
NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO	SIERRA
X-RAY	YANKEE	ZULU	ALPHA	BRAVO	CHARLIE
TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE

WHISKEY	X-RAY	YANKEE	ZULU
<i>FOXTROT</i>	<i>GOLF</i>	<i>HOTEL</i>	<i>INDIA</i>
OSCAR	PAPA	QUEBEC	ROMEO
LIMA	MIKE	NOVEMBER	OSCAR
TANGO	UNIFORM	VICTOR	WHISKEY
DELTA	ECHO	FOXTROT	GOLF
ZULU	ALPHA	BRAVO	CHARLIE

ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL
<i>INDIA</i>	<i>JULIETTE</i>	<i>KILO</i>	<i>LIMA</i>	<i>MIKE</i>	<i>NOVEMBER</i>	<i>OSCAR</i>	<i>PAPA</i>
SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE	ALPHA
KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO
X-RAY	YANKEE	ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT
ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE	KILO	LIMA
CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE

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INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA
<i>QUEBEC</i>	<i>ROMEO</i>	<i>SIERRA</i>	<i>TANGO</i>	<i>UNIFORM</i>	<i>VICTOR</i>	<i>WHISKEY</i>	<i>X-RAY</i>
BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA
SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE	ALPHA
GOLF	HOTEL	INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER
MIKE	NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO	SIERRA	TANGO
KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO

QUEBEC	ROMEO	SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE
<i>YANKEE</i>	<i>ALPHA</i>	<i>BRAVO</i>	<i>CHARLIE</i>	<i>DELTA</i>	<i>ECHO</i>	<i>FOXTROT</i>	<i>GOLF</i>	<i>HOTEL</i>
JULIETTE	KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA	QUEBEC	ROMEO
BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE
OSCAR	PAPA	QUEBEC	ROMEO	SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY
UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE	ALPHA	BRAVO	CHARLIE	DELTA
SIERRA	TANGO	UNIFORM	VICTOR	WHISKEY	X-RAY	YANKEE	ALPHA	BRAVO

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ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL
<i>HOTEL</i>	<i>INDIA</i>	<i>JULIETTE</i>	<i>KILO</i>	<i>LIMA</i>	<i>MIKE</i>	<i>NOVEMBER</i>	<i>OSCAR</i>
KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA	ALPHA	BRAVO
OSCAR	PAPA	ALPHA	BRAVO	CHARLIE	DELTA	ECHO	FOXTROT
CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE

INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA
<i>PAPA</i>	<i>ALPHA</i>	<i>BRAVO</i>	<i>CHARLIE</i>	<i>DELTA</i>	<i>ECHO</i>	<i>FOXTROT</i>	<i>GOLF</i>
CHARLIE	DELTA	ECHO	FOXTROT	GOLF	HOTEL	INDIA	JULIETTE
GOLF	HOTEL	INDIA	JULIETTE	KILO	LIMA	MIKE	NOVEMBER
KILO	LIMA	MIKE	NOVEMBER	OSCAR	PAPA	ALPHA	BRAVO