

02 Mini Project

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As college students, we are interested in data on colleges and universities in Minnesota and the surrounding states. As the “enrollment cliff” nears, questions regarding higher education are particularly interesting. We are curious about how many schools are in the state, the size of the schools, and any other variables that provide college-level information. We want to investigate this college-wide data in hopes of building a better picture of what further education in Minnesota looks like. Additionally, we are curious about how schools in the Minnesota Intercollegiate Athletic Conference (MIAC) may differ from schools that are not in the MIAC.

We used the table scraping approach to get data from the Wikipedia page [“List of Colleges and Universities in Minnesota”](#). Additionally, we collected data on MIAC schools using the same approach from the Wikipedia page [“Minnesota Intercollegiate Athletic Conference”](#).

We cleaned our data and renamed our column names to see the different nuances in this dataset, excluding the defunct institutions, and only focusing on the current, operating colleges in the area. We decided to make a tibble of all schools and a tibble of schools that are not in the MIAC to see if indicators like enrollment or whether the school is public or private differ. This would help us understand how MIAC schools differ from non-MIAC schools.

Using the polite package, we confirmed that we were scraping the data ethically and responsibly and following good web scraping practices. Before we scraped it, we also made sure we were complying with the website’s terms of service.

After scraping and tidying our data, we could easily view the geographic location of each college by making a map (after finding the latitude and longitude for each). Additionally, we could visualize our data in numerous ways. For example, we could make a bar chart of average enrollment with bins for each institution type.

MN COLLEGES/UNIVERSITY

```
# check that scraping is allowed (Step 0)
robotstxt::paths_allowed("https://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_
```

en.wikipedia.org

[1] TRUE

```
# Step 1: read_html()
mn_colleges <- read_html("https://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_")

# 2: html_nodes()
tables <- html_nodes(mn_colleges, css = "table")
tables # have to guesstimate which table contains climate info
```

```
{xml_nodeset (8)}
```

```
[1] <table class="box-Update plainlinks metadata ambox ambox-content ambox-Up ...
[2] <table class="wikitable sortable plainrowheaders" style="text-align:left; ...
[3] <table class="wikitable sortable plainrowheaders" style="text-align:left; ...
[4] <table class="wikitable plainrowheaders" style="text-align:left; width:au ...
[5] <table class="nowraplinks hlist mw-collapsible autocollapse navbox-inner" ...
[6] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" style ...
[7] <table class="nowraplinks navbox-subgroup" style="border-spacing:0"><tbo ...
[8] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" style ...
```

```
# 3: html_table()
html_table(tables, header = TRUE, fill = TRUE) # find the right table
```

[[1]]

A tibble: 0 x 2

i 2 variables: <lg1>,

This article needs to be updated. Please help update this article to reflect recent even

[[2]]

A tibble: 74 x 6

Institution	Location(s)	Control[<i>note 1</i>]	Type[<i>note 2</i>]
<chr>	<chr>	<chr>	<chr>
1 Alexandria Technical and Comm~	Alexandria	Public	Associate's c~
2 Anoka Technical College	Anoka	Public	Associate's c~
3 Anoka-Ramsey Community College	Coon Rapids,~	Public	Associate's c~
4 Bemidji State University	Bemidji	Public	Master's univ~
5 Central Lakes College	Brainerd, St~	Public	Associate's c~
6 Century College	White Bear L~	Public	Associate's c~
7 Dakota County Technical Colle~	Rosemount	Public	Associate's c~

```

8 Fond du Lac Tribal and Commun~ Cloquet          Public          Tribal college
9 Hennepin Technical College      Brooklyn Par~ Public          Associate's c~
10 Minnesota North College        Hibbing, Ita~ Public          Associate's c~
# i 64 more rows
# i 2 more variables: `Enrollment[14](fall 2023)` <chr>, Founded <chr>

```

```
[[3]]
```

```
# A tibble: 20 x 6
```

	Institution	`Location(s)`	Control	Founded	Closed	Ref
	<chr>	<chr>	<chr>	<chr>	<chr>	<chr>
1	"Albert Lea College"	"Albert Lea"	"Priva~	"1885"	"1973"	""
2	"Argosy University"	"Eagan"	"Priva~	"2001"	"2019"	"[85~
3	"College of Visual Arts"	"St. Paul"	"Priva~	"1924"	"2013"	"[86~
4	"Duluth Business University"	"Duluth"	"Priva~	"1891[~	"2018"	"[88~
5	"Fairlakes State Junior College"	"Fairmont"	"Publi~	"1973"	"1975"	"[89~
6	"Golden Valley Lutheran College"	"Golden Vall~	"Priva~	"1919"	"1985"	"[91~
7	"International Center for Naturob~	"Bemidji, Mi~	"Priva~	"1978"	"1984"	"[92~
8	"Lea College"	"Albert Lea"	"Priva~	"1965"	"1973"	"[93~
9	"Pillsbury Baptist Bible College"	"Owatonna"	"Priva~	"1957"	"2008"	"[94~
10	"College of Saint Teresa"	"Winona"	"Priva~	"1907"	"1989"	"[95~
11	"Southern Minnesota Normal Colleg~	"Austin"	"Publi~	"1897"	"1925"	"[96~
12	"Minnesota Central University"	"Hastings"	"Publi~	"1857"	"1867"	""
13	"University of Minnesota Waseca"	"Waseca"	"Publi~	"1971"	"1992"	"[97~
14	"Brown College"	"Mendota Hei~	"Priva~	"1946"	"2015"	""
15	"Crossroads College"	"Rochester"	"Priva~	"1913"	"2016"	"[98~
16	"Globe University and Minnesota S~	"multiple"	"Priva~	"1877"	"2016"	""
17	"McNally Smith College of Music"	"St. Paul"	"Priva~	"1985"	"2017"	""
18	"Minneapolis Business College"	"Roseville"	"Priva~	"1874"	"2019"	""
19	"CenterPoint Massage & Shiatsu Sc~	"St. Louis P~	"Priva~	"2001"	"2021"	""
20	"National for-profit institution ~	"National fo~	"Natio~	"Natio~	"Nati~	"Nat~

```
[[4]]
```

```
# A tibble: 23 x 2
```

	Abbreviation	`Accrediting agency`
	<chr>	<chr>
1	AAMFT	American Association for Marriage and Family Therapy
2	AANA	American Association of Nurse Anesthetists
3	ABA	American Bar Association
4	ACICS	Accrediting Council for Independent Colleges and Schools
5	ACME	Accreditation Commission for Midwifery Education
6	ACPE	Accreditation Council for Pharmacy Education
7	ADA	American Dental Association
8	ADA	American Dietetic Association

```

9 AOTA      American Occupational Therapy Association
10 APA      American Psychological Association
# i 13 more rows

```

```
[[5]]
```

```
# A tibble: 5 x 2
```

```

.mw-parser-output .navbar{display:inline;font-size:88%1 .mw-parser-output .n~2
<chr>                                     <chr>
1 States                                "Alabama\nAlaska\nAri~
2 Federal district                     "Washington, D.C."
3 Territories                           "American Samoa\nGuam~
4 By type                               "Community\nDental\nH~
5 By measure                            "Alphabetical index\n~

```

```
# i abbreviated names:
```

```

# 1: `.mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser~
# 2: `.mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser~

```

```
[[6]]
```

```
# A tibble: 5 x 4
```

```

`vteColleges and universities in Minnesota` vteColleges and univ~1 `` ``
<chr>                                     <chr> <chr> <chr>
1 Public: University of Minnesota System "University of Minnes~ <NA> <NA>
2 Public: Minnesota State Colleges and Unive~ "Bemidji State\nMetro~ <NA> <NA>
3 Private institutions                    "Adler\nAugsburg\nBet~ <NA> <NA>
4 Community/technical colleges            "Minnesota North Coll~ Minn~ "Hib~
5 Minnesota North College                  "Hibbing\nItasca\nMes~ <NA> <NA>

```

```
# i abbreviated name: 1: `vteColleges and universities in Minnesota`
```

```
[[7]]
```

```
# A tibble: 0 x 2
```

```
# i 2 variables: Minnesota North College <lgl>,
```

```
# Hibbing
```

```
Itasca
```

```
Mesabi Range
```

```
Rainy River
```

```
Vermilion <lgl>
```

```
[[8]]
```

```
# A tibble: 7 x 2
```

```

`vteState of Minnesota`      `vteState of Minnesota`
<chr>                         <chr>
1 Saint Paul (capital)        "Saint Paul (capital)"
2 Topics                       "Index\nOutline\nBiking/Cycling\nCities\nClima~

```

```

3 Society "Abortion\nCulture\nCrime\nDemographics\nEcono~
4 Regions "Arrowhead\nBoundary Waters\nBuffalo Ridge\nCe~
5 Largest citiespop. over 25,000 "Andover\nApple Valley\nAustin\nBlaine\nBloomi~
6 Counties "Aitkin\nAnoka\nBecker\nBeltrami\nBenton\nBig ~
7 Minnesota portal "Minnesota portal"

```

```

mn_data1 <- html_table(tables, header = TRUE, fill = TRUE)[[2]]
mn_data1

```

```

# A tibble: 74 x 6
  Institution `Location(s)` `Control[note 1]` `Type[note 2]`
  <chr> <chr> <chr> <chr>
1 Alexandria Technical and Comm~ Alexandria Public Associate's c~
2 Anoka Technical College Anoka Public Associate's c~
3 Anoka-Ramsey Community College Coon Rapids,~ Public Associate's c~
4 Bemidji State University Bemidji Public Master's univ~
5 Central Lakes College Brainerd, St~ Public Associate's c~
6 Century College White Bear L~ Public Associate's c~
7 Dakota County Technical Colle~ Rosemount Public Associate's c~
8 Fond du Lac Tribal and Commun~ Cloquet Public Tribal college
9 Hennepin Technical College Brooklyn Par~ Public Associate's c~
10 Minnesota North College Hibbing, Ita~ Public Associate's c~
# i 64 more rows
# i 2 more variables: `Enrollment[14](fall 2023)` <chr>, Founded <chr>

```

```

#combine steps using bow and scrape
session <- bow("https://en.wikipedia.org/wiki/List_of_colleges_and_universities_in_Minnesota")

result <- scrape(session) |>
  html_nodes(css = "table") |>
  html_table(header = TRUE, fill = TRUE)

mn_data2 <- result[[2]] #scrape the correct table and name it mn_data2

print(mn_data2, n = 10)

```

```

# A tibble: 74 x 6
  Institution `Location(s)` `Control[note 1]` `Type[note 2]`
  <chr> <chr> <chr> <chr>
1 Alexandria Technical and Comm~ Alexandria Public Associate's c~
2 Anoka Technical College Anoka Public Associate's c~

```

```

3 Anoka-Ramsey Community College Coon Rapids,~ Public      Associate's c~
4 Bemidji State University      Bemidji      Public      Master's univ~
5 Central Lakes College         Brainerd, St~ Public      Associate's c~
6 Century College               White Bear L~ Public      Associate's c~
7 Dakota County Technical Colle~ Rosemount    Public      Associate's c~
8 Fond du Lac Tribal and Commun~ Cloquet      Public      Tribal college
9 Hennepin Technical College    Brooklyn Par~ Public      Associate's c~
10 Minnesota North College      Hibbing, Ita~ Public      Associate's c~
# i 64 more rows
# i 2 more variables: `Enrollment[14](fall 2023)` <chr>, Founded <chr>

```

```

#clean the table and name it mn_colleges
mn_colleges <- mn_data2 |>
  clean_names() |>
  rename(
    locations = location_s,
    public_private = control_note_1,
    type = type_note_2,
    enrollment = enrollment_14_fall_2023,
    date_founded = founded
  ) |>
  mutate(enrollment = parse_number(enrollment))

print(mn_colleges, n = 10)

```

```

# A tibble: 74 x 6
  institution      locations public_private type enrollment date_founded
  <chr>            <chr>      <chr>      <chr>    <dbl> <chr>
1 Alexandria Technical ~ Alexandr~ Public    Asso~    2865 1961[15]
2 Anoka Technical Colle~ Anoka     Public    Asso~    1580 1967[16]
3 Anoka-Ramsey Communit~ Coon Rap~ Public    Asso~    7902 1965[17]
4 Bemidji State Univers~ Bemidji   Public    Mast~    4023 1919[18]
5 Central Lakes College Brainerd~ Public    Asso~    4633 1938[19]
6 Century College      White Be~ Public    Asso~    7646 1967[20]
7 Dakota County Technic~ Rosemount Public    Asso~    2717 1970[21]
8 Fond du Lac Tribal an~ Cloquet   Public    Trib~    1648 1987[22]
9 Hennepin Technical Co~ Brooklyn~ Public    Asso~    3974 1972[23]
10 Minnesota North Colle~ Hibbing,~ Public    Asso~    3044 1916[24]
# i 64 more rows

```

```
#filter and clean minnesota college/university data more, select institutions
mn_institutions <- mn_colleges |>
  clean_names() |>
  select(institution) |>
  mutate(
    #making st bens and st johns "one college"
    institution = str_trim(str_replace(institution, "and Saint John's University", ""))
  )

mn_list <- as.list(mn_institutions$institution) #convert to a list for the function below
mn_list
```

```
[[1]]
[1] "Alexandria Technical and Community College"

[[2]]
[1] "Anoka Technical College"

[[3]]
[1] "Anoka-Ramsey Community College"

[[4]]
[1] "Bemidji State University"

[[5]]
[1] "Central Lakes College"

[[6]]
[1] "Century College"

[[7]]
[1] "Dakota County Technical College"

[[8]]
[1] "Fond du Lac Tribal and Community College"

[[9]]
[1] "Hennepin Technical College"

[[10]]
[1] "Minnesota North College"
```

[[11]]
[1] "Inver Hills Community College"

[[12]]
[1] "Lake Superior College"

[[13]]
[1] "Leech Lake Tribal College"

[[14]]
[1] "Metropolitan State University"

[[15]]
[1] "Minneapolis Community and Technical College"

[[16]]
[1] "Minnesota State College Southeast"

[[17]]
[1] "Minnesota State Community and Technical College"

[[18]]
[1] "Minnesota State University, Mankato"

[[19]]
[1] "Minnesota State University Moorhead"

[[20]]
[1] "Minnesota West Community and Technical College"

[[21]]
[1] "Normandale Community College"

[[22]]
[1] "North Hennepin Community College"

[[23]]
[1] "Northland Community & Technical College"

[[24]]
[1] "Northwest Technical College"

[[25]]
[1] "Pine Technical and Community College"

[[26]]
[1] "Ridgewater College"

[[27]]
[1] "Riverland Community College"

[[28]]
[1] "Rochester Community and Technical College"

[[29]]
[1] "St. Cloud State University"

[[30]]
[1] "St. Cloud Technical and Community College"

[[31]]
[1] "Saint Paul College"

[[32]]
[1] "South Central College"

[[33]]
[1] "Southwest Minnesota State University"

[[34]]
[1] "University of Minnesota Crookston"

[[35]]
[1] "University of Minnesota Duluth"

[[36]]
[1] "University of Minnesota Morris"

[[37]]
[1] "University of Minnesota Rochester"

[[38]]
[1] "University of Minnesota, Twin Cities"

[[39]]

[1] "White Earth Tribal and Community College"

[[40]]

[1] "Winona State University"

[[41]]

[1] "Academy College"

[[42]]

[1] "Adler Graduate School"

[[43]]

[1] "Augsburg University"

[[44]]

[1] "Bethany Global University"

[[45]]

[1] "Bethany Lutheran College"

[[46]]

[1] "Bethel University"

[[47]]

[1] "Carleton College"

[[48]]

[1] "College of Saint Benedict"

[[49]]

[1] "College of St. Scholastica"

[[50]]

[1] "Concordia College"

[[51]]

[1] "Concordia University"

[[52]]

[1] "Crown College"

[[53]]

[1] "Dunwoody College of Technology"

[[54]]
[1] "Gustavus Adolphus College"

[[55]]
[1] "Hamline University"

[[56]]
[1] "Hazelden Graduate School of Addiction Studies"

[[57]]
[1] "Luther Seminary"

[[58]]
[1] "Macalester College"

[[59]]
[1] "Martin Luther College"

[[60]]
[1] "Mayo Clinic College of Medicine and Science"

[[61]]
[1] "Minneapolis College of Art and Design"

[[62]]
[1] "Mitchell Hamline School of Law"

[[63]]
[1] "North Central University"

[[64]]
[1] "Northwestern Health Sciences University"

[[65]]
[1] "Oak Hills Christian College"

[[66]]
[1] "St. Catherine University"

[[67]]
[1] "Saint Mary's University of Minnesota"

```
[[68]]
[1] "St. Olaf College"

[[69]]
[1] "United Theological Seminary of the Twin Cities"

[[70]]
[1] "University of Northwestern - St. Paul"

[[71]]
[1] "University of St. Thomas"

[[72]]
[1] "Capella University"

[[73]]
[1] "Rasmussen University"

[[74]]
[1] "Walden University"
```

MIAC CONFERENCE

```
# check that scraping is allowed (Step 0)
robotstxt::paths_allowed("https://en.wikipedia.org/wiki/Minnesota_Intercollegiate_Athletic_C
```

```
en.wikipedia.org
```

```
[1] TRUE
```

```
# Step 1: read_html()
miac_colleges <- read_html("https://en.wikipedia.org/wiki/Minnesota_Intercollegiate_Athletic_C

# 2: html_nodes()
miac_tables <- html_nodes(miac_colleges, css = "table")
miac_tables # have to guesstimate which table contains climate info
```

```
{xml_nodeset (17)}
```

```
[1] <table class="infobox">\n<caption class="infobox-title">Minnesota Interc ...
[2] <table class="wikitable sortable" style="text-align:center;"><tbody>\n<t ...
[3] <table class="wikitable sortable" style="text-align:center;"><tbody>\n<t ...
[4] <table width="400" style="float:right"><tbody>\n<tr><td colspan="2">A di ...
[5] <table class="wikitable"><tbody>\n<tr>\n<th>Men's</th>\n<th>Titles</th>\ ...
[6] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[7] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[8] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[9] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[10] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[11] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[12] <table class="wikitable"><tbody>\n<tr>\n<th>Team</th>\n<th>Titles</th>\n ...
[13] <table class="wikitable"><tbody>\n<tr>\n<th>School\n</th>\n<th>Stadium\n ...
[14] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" styl ...
[15] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" styl ...
[16] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" styl ...
[17] <table class="nowraplinks mw-collapsible autocollapse navbox-inner" styl ...
```

```
# 3: html_table()
html_table(miac_tables, header = TRUE, fill = TRUE) # find the right table
```

```
[[1]]
```

```
# A tibble: 11 x 2
```

```
  <chr> <chr>
1 "Association" "NCAA"
2 "Founded" "March 15, 1920"
3 "Commissioner" "Dan McKane (since 2005)"
4 "Sports fielded" "22\nmen's: 11\nwomen's: 11"
5 "Division" "Division III"
6 "No. of teams" "13"
7 "Headquarters" "Bloomington, Minnesota"
8 "Region" "Minnesota"
9 "Official website" "www.miacathletics.com"
10 "Locations" "Locations"
11 "" ""
```

```
[[2]]
```

```
# A tibble: 13 x 8
```

```
  Institution `Location[a]` Founded Affiliation Undergradenrollment[~1 Nickname
<chr> <chr> <int> <chr> <chr> <chr>
```

1	Augsburg U~ Minneapolis	1869	Lutheran(E~	2,550	Auggies
2	Bethel Uni~ Arden Hills	1871	Converge	2,965	Royals
3	Carleton C~ Northfield	1866	Nonsectari~	2,105	Knights
4	Concordia ~ Moorhead	1891	Lutheran (~	2,114	Cobbers
5	Gustavus A~ St. Peter	1862	Lutheran (~	2,230	Golden ~
6	Hamline Un~ St. Paul	1854	United Met~	2,184	Pipers
7	Macalester~ St. Paul	1874	Nonsectari~	2,146	Scots
8	College of~ St. Joseph	1913	Catholic(B~	1,958	Bennies
9	St. Cather~ St. Paul	1905	Catholic(C~	3,176	Wildcats
10	Saint John~ Collegeville	1857	Catholic(B~	1,754	Johnnies
11	Saint Mary~ Winona	1912	Catholic(L~	1,590	Cardina~
12	St. Olaf C~ Northfield	1874	Lutheran (~	3,040	Oles
13	College of~ Duluth	1912	Catholic(B~	3,906	Saints

i abbreviated name: 1: `Undergradenrollment[4]`
i 2 more variables: Joined <chr>, Colors <chr>

[[3]]

A tibble: 2 x 9

	Institution	Location[a]	Founded	Affiliation	Enrollment	Nickname	Joined	Left
	<chr>	<chr>	<int>	<chr>	<chr>	<chr>	<int>	<int>
1	University~	Duluth	1902	Public	11,729	Bulldogs	1951	1975
2	University~	St. Paul	1885	Catholic	6,199	Tommies	1920	2021

i 1 more variable: Currentconference <chr>

[[4]]

A tibble: 1 x 2

	`A divisional format is used for football.`	A divisional format ~1
	<chr>	<chr>
1	"Northwoods\nCarleton\nGustavus Adolphus\nSaint John's~	"Skyline\nAugsburg\nB~

i abbreviated name: 1: `A divisional format is used for football.`

[[5]]

A tibble: 5 x 6

	`Men's`	Titles	Last	`Women's`	Titles	Last
	<chr>	<int>	<int>	<chr>	<int>	<int>
1	St. Thomas	33	2019	"St. Thomas"	28	2019
2	Saint John's	14	2007	"Gustavus Adolphus"	5	2007
3	Gustavus Adolphus	5	2004	"St. Benedict"	2	1999
4	Macalester	5	1968	"St. Olaf"	2	1985
5	St. Olaf	1	1979	"	NA	NA

[[6]]

A tibble: 12 x 3

Team <chr>	Titles `Years won` <int> <chr>
1 Saint John's	36 1932, 1935c, 1936c, 1938, 1953c, 1962, 1963, 1965, ~
2 Gustavus Adolphus	22 1926, 1927, 1933, 1935c, 1936c, 1937, 1940, 1945, 1~
3 St. Thomas[a]	21 1922c, 1929, 1930c, 1939, 1941, 1942c, 1947c, 1948,~
4 Concordia	18 1931, 1934, 1942c, 1952c, 1957, 1964, 1969, 1970, 1~
5 St. Olaf	6 1922c, 1923, 1930c, 1935c, 1978c, 1979c
6 Hamline	5 1920, 1921, 1966, 1984, 1988c
7 Bethel	5 2000, 2001c, 2006c, 2007, 2013
8 UM-Duluth[a]	3 1960, 1961, 1973c
9 Augsburg	2 1928c, 1997
10 Carleton	2 1924, 1992
11 Macalester[b]	2 1925, 1947c
12 Saint Mary's[c]	1 1928c

[[7]]

A tibble: 9 x 3

Team <chr>	Titles `Years won` <int> <chr>
1 Gustavus Adolphus	16 1969, 1970, 1971, 1972, 1983c, 1993, 1994, 2000, 200~
2 Macalester	11 1988c, 1990, 1997, 1998c, 1999, 2001, 2002, 2003, 20~
3 Saint John's	9 1968, 1976, 1979, 1982, 1983c, 1986, 1988c, 1989c, 2~
4 St. Thomas[a]	9 1977, 1978, 1985, 1987, 1991, 1995c, 2016, 2017, 201~
5 St. Olaf	7 1984, 1992, 1998c, 2004c, 2011c, 2014c, 2021
6 Carleton	5 2007c, 2008, 2009, 2011c, 2012c
7 Augsburg	4 1973, 1974, 1975, 1980
8 Concordia	2 1995c, 1996
9 Bethel	1 1981

[[8]]

A tibble: 9 x 3

Team <chr>	Titles `Years won` <int> <chr>
1 Macalester	8 1992, 1997, 1998, 1999, 2000, 2001c, 2004, 2005
2 St. Thomas[a]	8 1987, 2001c, 2002c, 2008, 2015c, 2016c, 2018, 2019c
3 Saint Mary's	7 1983, 1985, 1986, 1988, 1989, 1990, 1991c
4 Gustavus Adolphus	6 1984, 1993, 1994, 1995, 1996, 2015c
5 St. Benedict	5 1991c, 2002c, 2003, 2011c, 2013
6 Concordia	4 2006, 2007, 2009, 2012
7 Augsburg	4 2014, 2016c, 2017, 2019c
8 Carleton	3 1982, 2010, 2011c
9 St. Catherine	1 2021

[[9]]

A tibble: 12 x 3

Team	Titles	Years won
<chr>	<int>	<chr>
1 St. Thomas[a]	34	1924, 1946c, 1949c, 1966, 1967, 1970, 1971, 1972, 1~
2 Hamline	19	1932, 1933, 1934, 1935, 1936, 1938c, 1939c, 1941, 1~
3 Gustavus Adolphus	17	1925, 1926, 1928, 1938c, 1954, 1955, 1956, 1968, 19~
4 Augsburg	13	1927, 1946c, 1963, 1964, 1965, 1975c, 1976, 1977, 1~
5 Saint John's	10	1969, 1978, 1979, 1986, 1987, 1993, 2001, 2018, 202~
6 Carleton	5	1921, 1922, 1923, 2006c, 2011c
7 UM-Duluth[a]	4	1958, 1959, 1961, 1962
8 St. Olaf	3	1929, 1930, 1989c
9 Concordia	3	1931, 1982, 1983
10 Macalester	2	1937, 1981c
11 Saint Mary's	2	1939c, 1940
12 Bethel	1	2017c

[[10]]

A tibble: 9 x 3

Team	Titles	Years won
<chr>	<int>	<chr>
1 St. Thomas[a]	18	1983c, 1984, 1991, 1992, 1996, 1997, 1998c, 2000, 20~
2 St. Benedict	13	1989, 1993, 1995, 1998c, 1999, 2002c, 2003c, 2004c, ~
3 Concordia	7	1982, 1983c, 1986c, 1987c, 1988, 1990, 2013
4 Carleton	3	2003c, 2004c, 2005
5 Saint Mary's	3	1985, 1986c, 2014
6 Gustavus Adolphus	2	2003c, 2010c
7 Bethel	2	1994, 2020
8 St. Olaf	1	1983c
9 Augsburg	1	2022

[[11]]

A tibble: 11 x 3

Team	Titles	Years won
<chr>	<int>	<chr>
1 St. Thomas[a]	34	1923c, 1934, 1938c, 1940, 1941, 1942, 1947, 1949, 1~
2 Gustavus Adolphus	14	1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 197~
3 Macalester[b]	12	1923c, 1930, 1931, 1932c, 1933, 1936, 1937, 1939c, ~
4 Augsburg	11	1928, 1977c, 1978, 1979, 1980, 1981c, 1982, 1998c, ~
5 UM-Duluth[a]	9	1953c, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 19~
6 Saint John's	9	1935, 1950c, 1996, 1997, 2003, 2004, 2005, 2013c, 2~
7 Hamline	5	1923c, 1932c, 1948, 2008, 2011
8 Saint Mary's	4	1929, 1964, 1965, 1988

9 St. Olaf	3 1938c, 1939c, 2009
10 Concordia	2 1981c, 1987
11 Bethel	1 2007

[[12]]

A tibble: 5 x 3

Team	Titles	Years won
<chr>	<int>	<chr>
1 Gustavus Adolphus	17	1999c, 2001, 2002, 2005, 2006, 2007, 2008, 2009, 201~
2 St. Thomas[a]	6	2003, 2004, 2014, 2016c, 2018c, 2019
3 Augsburg	2	1999c, 2000c
4 Saint Mary's	2	1999c, 2000c
5 Bethel	1	2016c

[[13]]

A tibble: 12 x 7

School	Stadium	Capacity	Gymnasium	Capacity	Ice arena	Capacity
<chr>	<chr>	<chr>	<chr>	<chr>	<chr>	<chr>
1 Augsburg	Edor Nels~	1,400	Si Melby~	2,200	Augsburg I~	800
2 Bethel	Royal Sta~	8,000	Robertso~	2,000	Schwan Sup~	1,000
3 Carleton	Laird Sta~	7,500	West Gym~	1,240	Non-Hockey~	N/A
4 Concordia	Jake Chri~	7,000	Memorial~	4,500	Moorhead S~	3,000
5 Gustavus Adolphus	Hollingsw~	3,000	Gus Youn~	3,000	Don Robert~	1,500
6 Hamline	Klas Field	2,000	Hutton A~	2,000	TRIA Rink ~	1,500
7 Macalester	Macaleste~	4,000	Leonard ~	1,200	Non-Hockey~	N/A
8 St. Benedict	CSB Socce~	N/A	Claire L~	1,000	Municipal ~	1,800
9 St. Catherine	Soccer Fi~	N/A	Wildcat ~	500	Drake Arena	700
10 Saint John's	Clemens S~	7,482	Sexton A~	2,964	National H~	5,763
11 St. Olaf	Klein Fie~	3,500	Skoglund~	3,000	St. Olaf I~	800
12 St. Scholastica	Saints Fi~	N/A	Reif Gym	N/A	Mars Lakev~	N/A

[[14]]

A tibble: 1 x 2

```
.mw-parser-output .navbar{display:inline;font-size:88~1 .mw-parser-output .n~2
<chr>                                     <chr>
1 "Augsburg Auggies\nBethel Royals\nCarleton Knights\nCo~ "Augsburg Auggies\nBe~
# i abbreviated names:
# 1: `.mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser
# 2: `.mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser
```

[[15]]

A tibble: 1 x 2

`vteNCAA Division III all-sports conferences`	vteNCAA Division III~1
---	------------------------

```

      <chr>                                     <chr>
1 "Allegheny Mountain Collegiate Conference\nAmerican Ri~ "Allegheny Mountain C~
# i abbreviated name: 1: `vteNCAA Division III all-sports conferences`

```

```

[[16]]
# A tibble: 2 x 2
  `vteNCAA Division III football conferences` vteNCAA Division III~1
  <chr>                                     <chr>
1 "American Rivers Conference\nAmerican Southwest Confer~ "American Rivers Conf~
2 "NCAA Division III Football Championship"                "NCAA Division III Fo~
# i abbreviated name: 1: `vteNCAA Division III football conferences`

```

```

[[17]]
# A tibble: 4 x 3
  vteNCAA Division III ice hocke~1 vteNCAA Division III~2 vteNCAA Division III~3
  <chr>                             <chr>                             <lg1>
1 Men                               "Conference of New En~ NA
2 Women                             "Conference of New En~ NA
3 NCAA                             "College ice hockey\n~ NA
4 Former                           "Colonial Hockey Conf~ NA
# i abbreviated names: 1: `vteNCAA Division III ice hockey conferences`,
#   2: `vteNCAA Division III ice hockey conferences`,
#   3: `vteNCAA Division III ice hockey conferences`

```

```

miac_data <- html_table(miac_tables, header = TRUE, fill = TRUE)[[2]]

print(miac_data, n = 10)

```

```

# A tibble: 13 x 8
  Institution `Location[a]` Founded Affiliation Undergradenrollment[~1 Nickname
  <chr>      <chr>          <int> <chr>          <chr>          <chr>
1 Augsburg U~ Minneapolis  1869 Lutheran(E~ 2,550          Auggies
2 Bethel Uni~ Arden Hills  1871 Converge   2,965          Royals
3 Carleton C~ Northfield  1866 Nonsectari~ 2,105          Knights
4 Concordia ~ Moorhead    1891 Lutheran (~ 2,114          Cobbers
5 Gustavus A~ St. Peter    1862 Lutheran (~ 2,230          Golden ~
6 Hamline Un~ St. Paul     1854 United Met~ 2,184          Pipers
7 Macalester~ St. Paul     1874 Nonsectari~ 2,146          Scots
8 College of~ St. Joseph  1913 Catholic(B~ 1,958          Bennies
9 St. Cather~ St. Paul     1905 Catholic(C~ 3,176          Wildcats
10 Saint John~ Collegeville 1857 Catholic(B~ 1,754          Johnnies
# i 3 more rows

```

```
# i abbreviated name: 1: `Undergradenrollment[4]`
# i 2 more variables: Joined <chr>, Colors <chr>
```

```
#bow and scrape data
session <- bow("https://en.wikipedia.org/wiki/Minnesota_Intercollegiate_Athletic_Conference")

miac_result <- scrape(session) |>
  html_nodes(css = "table") |>
  html_table(header = TRUE, fill = TRUE)

#begin cleaning miac data
miac_data1 <- miac_result[[2]] |>
  clean_names()

miac_data1 <- miac_data1 |>
  select(institution) |>
  mutate(
    #fixing name consistency
    institution = str_trim(str_replace(institution, "\\[.*\\]", ""), side = "right"),
    institution = str_trim(str_replace(institution, "Mary's University", "Mary's University of Minnesota"))
  )

miac_data1
```

```
# A tibble: 13 x 1
  institution
  <chr>
1 Augsburg University
2 Bethel University
3 Carleton College
4 Concordia College
5 Gustavus Adolphus College
6 Hamline University
7 Macalester College
8 College of Saint Benedict
9 St. Catherine University
10 Saint John's University
11 Saint Mary's University of Minnesota
12 St. Olaf College
13 College of St. Scholastica
```

```
miac_list <- as.list(miac_data1$institution) #turn miac_data into a list for the function be  
miac_list
```

```
[[1]]  
[1] "Augsburg University"  
  
[[2]]  
[1] "Bethel University"  
  
[[3]]  
[1] "Carleton College"  
  
[[4]]  
[1] "Concordia College"  
  
[[5]]  
[1] "Gustavus Adolphus College"  
  
[[6]]  
[1] "Hamline University"  
  
[[7]]  
[1] "Macalester College"  
  
[[8]]  
[1] "College of Saint Benedict"  
  
[[9]]  
[1] "St. Catherine University"  
  
[[10]]  
[1] "Saint John's University"  
  
[[11]]  
[1] "Saint Mary's University of Minnesota"  
  
[[12]]  
[1] "St. Olaf College"  
  
[[13]]  
[1] "College of St. Scholastica"
```

```

#creating function to look for MN colleges who aren't in the miac
not_in_miac <- function(college_list) {
  not_matched <- vector()
  for(i in college_list){
    if(!(i %in% miac_list)) {
      not_matched <- c(not_matched, i)
    }
  }
  not_matched
}

test <- as_tibble(not_in_miac(mn_list)) #make a tibble of non_miac schools

non_miac_colleges <- test |>
  left_join(mn_colleges, by = join_by(value == institution)) #left_join to end with a tibble

slice_head(non_miac_colleges, n = 10)

```

A tibble: 10 x 6

	value <chr>	locations <chr>	public_private <chr>	type <chr>	enrollment <dbl>	date_founded <chr>
1	Alexandria Technical ~	Alexandr~	Public	Asso~	2865	1961[15]
2	Anoka Technical Colle~	Anoka	Public	Asso~	1580	1967[16]
3	Anoka-Ramsey Communit~	Coon Rap~	Public	Asso~	7902	1965[17]
4	Bemidji State Univers~	Bemidji	Public	Mast~	4023	1919[18]
5	Central Lakes College	Brainerd~	Public	Asso~	4633	1938[19]
6	Century College	White Be~	Public	Asso~	7646	1967[20]
7	Dakota County Technic~	Rosemount	Public	Asso~	2717	1970[21]
8	Fond du Lac Tribal an~	Cloquet	Public	Trib~	1648	1987[22]
9	Hennepin Technical Co~	Brooklyn~	Public	Asso~	3974	1972[23]
10	Minnesota North Colle~	Hibbing,~	Public	Asso~	3044	1916[24]

```
slice_head(mn_colleges, n = 10)
```

A tibble: 10 x 6

	institution <chr>	locations <chr>	public_private <chr>	type <chr>	enrollment <dbl>	date_founded <chr>
1	Alexandria Technical ~	Alexandr~	Public	Asso~	2865	1961[15]
2	Anoka Technical Colle~	Anoka	Public	Asso~	1580	1967[16]
3	Anoka-Ramsey Communit~	Coon Rap~	Public	Asso~	7902	1965[17]

4	Bemidji State Univers~	Bemidji	Public	Mast~	4023	1919[18]
5	Central Lakes College	Brainerd~	Public	Asso~	4633	1938[19]
6	Century College	White Be~	Public	Asso~	7646	1967[20]
7	Dakota County Technic~	Rosemount	Public	Asso~	2717	1970[21]
8	Fond du Lac Tribal an~	Cloquet	Public	Trib~	1648	1987[22]
9	Hennepin Technical Co~	Brooklyn~	Public	Asso~	3974	1972[23]
10	Minnesota North Colle~	Hibbing,~	Public	Asso~	3044	1916[24]