State of the University Address 2015  
NUS President Professor Tan Chorh Chuan  
27 October 2015

Another 110 (%)

NUS Pro-Chancellors  
NUS Chairman and Trustees  
Distinguished Guests  
Colleagues, Students, Alumni and Friends  
Ladies and Gentlemen

As we are marking Singapore’s 50th anniversary this year, I was curious to know what my predecessor, the Vice Chancellor of the University of Singapore was preoccupied with in 1965. In researching this, I noticed straight off that he made many speeches including a signature one called the Foundation Day Rally. In 1965, this was delivered to a group of 100 guests and students on 1 January. I guess some things don’t change!

But Vice Chancellors must have been much more powerful in those days - if I scheduled my State of the University Address on New Year’s Day itself, I am sure I would be the only one attending. Vice Chancellor Professor Lim Tay Boh’s Foundation Day speech in 1965 outlined a major expansion plan involving the setting up of three new Schools and the construction of a new wing for the Science Faculty.

Sources: National Archives Singapore, ST and Malayan Undergrad
My sense of déjà vu was heightened, when I read about the preparations to mark the 60th anniversary of the Faculty of Medicine. On this, the Vice Chancellor made a pitch for donations, for the development of teaching and research in the Medical Faculty. As we live our modern lives in 2015, it is good to know that many things have not changed fundamentally.

Yet, many other things have. In 1965, our university was primarily a strong teaching institution, whereas today, NUS is an internationally recognised educational institution, and also a global research powerhouse, creating high impact through both research and education.

NUS Research and its Impact

Perhaps the best way to appreciate this change is to look at some examples. Our faculty have made important contributions across a wide range of fields, so I apologise I am only able to share a tiny sample of their work today.

Let me start with some of our contributions to addressing key societal issues. NUS is a world leader in water research; this year, Professor Neal Chung from Engineering received the President’s Technology Award for his pioneering work in inventing and applying novel membrane technologies. This is the highest national award recognising outstanding research resulting in significant new technologies.

Beyond membranes, our researchers have done excellent work in many areas, including devising creative ways to monitor water quality. On the water, are NUSwans, developed by the NUS Environmental Research Institute and Tropical Marine Sciences Institute. These robotic swans cruise around by themselves, measure water quality and wirelessly transmit data real-time.
In the water, NERI has genetically engineered fish that can detect water pollution. Those of you who have read the Hitchhiker’s Guide to the Galaxy may remember the super-chromatic peril sensitive sunglasses – when there is danger, the glasses keep you calm by turning completely black so you can’t see the on-coming danger! Well these genetically engineered fish work in the opposite way – they glow when there are contaminants in the water.

Our Faculties of Engineering, Design and Environment, Science and Medicine also work extensively on air pollution. For example, they have developed methods to measure and track the air-borne compounds released by burning forests. These can be used to assess how much trans-boundary haze is contributing to air pollution.

Over at the Duke-NUS Graduate Medical School, Professor David Virshup’s work in collaboration with ASTAR has resulted in the first publicly-funded drug candidate to be discovered and developed in Singapore. This cancer drug is now in Phase 1 clinical trials in the National Cancer Centre and National University Hospital.

Professor Dario Campana, from the Yong Loo Lin School of Medicine, has developed a novel cancer treatment that uses an antibody coupled with modified T-cells to recognise and kill cancer cells. The company he formed to commercialise this technology has started clinical trials, and was named by the journal Nature Biotechnology as one of the top academic spinouts of 2014.
Professor Saw Seang Mei and colleagues at the Saw Swee Hock School of Public Health and Singapore Eye Research Institute, have shown that spending time outdoors can reduce myopia in children. Among Singapore teenagers, for every hour spent per day outside, the risk of myopia went down by 10%. This work has informed national programmes to reduce our very high rate of childhood myopia, which can lead to serious eye complications later in life.

Diabetes can also cause blinding eye disease which can be prevented by regular screening with retinal photographs. Professors Wynne Hsu and Lee Mong Li from our School of Computing developed computer-assisted analytic systems of retinal images that speed up and improve detection and tracking of eye diseases. Their systems are being used in many hospitals, industry, and universities, and have been applied to over 100,000 people. Last year, they won the President’s Technology Award together with Professor Wong Tien Yin.
Another multiple award-winning faculty is our Dean of Science, Professor Shen Zuowei, who pioneered highly cited mathematical methods that are used to improve image restoration and data reconstruction.

In law, public policy and social sciences, NUS has gained prominence as a thought-leader, especially on issues relating to Asia. Our Centre for International Law produced a book series published by Cambridge University Press, on “ASEAN Integration through Law”, which serves as the authoritative set of publications on this important topic. At the Lee Kuan Yew School of Public Policy, Dean Kishore Mahbubani was affirmed as a top 50 global thought-leader by the current affairs magazine Prospect.
I have shared examples of NUS research which have useful applications across a range of fields. However, I want to stress that a great deal more of our work is cutting-edge basic research, where the immediate outcomes are influential publications that extend the boundaries of knowledge and open new lines of inquiry. These span a vast range of topics, from quantum information to chemistry, from materials science to computer science, from geography to finance, from Asia studies to urban design, from nanotechnology to biological sciences, and so on.

Such work is critical and we must continue growing these basic research strengths as part of our long-term investment for the future.

**Our University Today**

Today NUS has not only established itself as a global research powerhouse, we are widely recognised as a centre of innovation in education, the top university in Asia and one of the leading universities in the world.

These achievements reflect the quality, creativity and impact of our talented faculty, staff, students and alumni, as well as the adroit leadership of Chairman Mr Wong Ngit Liong, and members of the NUS Board.

In this SG50 year, I am delighted we also recognised two special groups in our community - the everyday icons of NUS, each an institution in his or her own right; and the pioneer generation staff of our university. I had the pleasure of meeting two
of them over tea. Mr Gopal Nadesan and Mr Daani Suradi both joined in the 1940s, and between them, served our university for nearly 120 years!

Like many aspects of Singapore's dramatic growth over the past 50 years, our university owes much to the strong foundations laid by those who preceded us. I wish to pay special tribute to two transformative leaders, Professor Lim Pin and Professor Shih Choon Fong, who played such pivotal roles in NUS' rapid growth.

Since then, we have also been blessed with stellar leadership colleagues, who have kept NUS on a steeply rising path, in particular Provost Tan Eng Chye, Deputy President for Administration Mr Joseph Mullinix, Deputy President for Research Professor Ho Teck Hua and CEO of NUS Enterprise Dr Lily Chan. Together with our Deans and Directors, it is hard to find a more committed, passionate and talented band of leaders.
2015 is also a year of transition for the leadership team.

I would like to express our deepest thanks to Professor Barry Halliwell for his immense contributions during his nine years of outstanding service as Deputy President of Research.

Grateful thanks also to Mr Joseph Mullinix who will step down in December, after ten incredible years as Deputy President for Administration. His contributions are many and wide-ranging, but the most visible are new facilities like University Town and the Yale-NUS College complex. Mr Mullinix would be succeeded by Mr Don Yeo whom I would like to formally welcome.

Please join me in applauding these most remarkable NUS senior leadership colleagues!

Looking Forward

Colleagues and friends, we have come a very long way indeed. As we shift our gaze from the past to the future, what lies ahead for our university?

As I reflected on this in the past year, I drew useful insights from my travels. In December, I met this priest with lovely robes in a splendidly decorated room. He was presiding over a small but unusual church. Most unusual because the entire church had been carved out of a massive rock. The place was Lalibela in Ethiopia, which is famed for churches dating back to the 12th century, each carved out from monolithic rock.
Ethiopia is a fascinating country with a rich history. Evelyn and I enjoyed travelling through its historic towns and our 11-day trek in the Simien Mountains. It is interesting though that the most frequent questions I am asked here are: “Is it safe?”; “Wasn’t it very tough?”; “What did you eat?” To which we replied, indeed, Ethiopia is still a developing country. But today, it is one of the fastest growing economies in Africa with big plans for the future.

Our guide, Nick, did mountain treks, ran a small computer business and in the off-season, worked as a taxi driver. He and others there showed the grit and resourcefulness born of necessity.

In May this year, I was in Israel where I was very impressed by how technopreneurship has really taken off. The universities are doing exciting research and are key players in the burgeoning innovation ecosystem. I had dinner with five of the students attending the NUS Overseas College there, and visited the start-ups they were interning with. The facilities were modest but were filled with motivated, well qualified young people working away to create new businesses or disrupt existing ones.

In September, at the World Economic Forum in Dalian, I participated in sessions on how technology may replace many jobs now done by people; and how the “sharing economy” as exemplified by Airbnb and Uber, can fundamentally change the way many businesses operate.
The point I am coming to, is a simple one: all around us, from Ethiopia to China, from Israel to Silicon Valley, our world is on the move, changing rapidly and in unexpected directions. Big ideas and talented peoples, driven by passion, hunger or need, are fuelling change at an ever faster pace. Many exciting things are taking place in universities around the world, which are pushing the frontiers of innovation. Some of these will help shape the future in their own countries, and a few will have a larger global impact.

Here in Singapore, we must not under-estimate the speed and impact of the changing landscape and rising competition. We need to ask ourselves if NUS is positioned well for this fast-paced, competitive, and less predictable future. I believe we are, but for us to continue to seize and create big new opportunities, we need to pay careful attention to our core, to further strengthen three fundamental pillars of NUS.

These are **People, Culture and Purpose**.

The first pillar: Purpose. A strong sense of common purpose is vital for a diverse and talented community like NUS to continue to excel. It also motivates each of us to give even greater meaning and fulfilment, to our work.

I believe the most important purpose of our university is **to create distinctive and compelling value** for our students, for Singapore and the wider global community. But we must keep in mind that our university’s work is especially valuable because we contribute across a long time-scale.
In other words, we certainly do many things which are of immediate and short-term relevance. However, we must also pursue long-term initiatives and carry out basic research that may not have practical uses today, but which can lead to very major applications and impact 10, 15 or 20 years in the future. In other words, NUS is not just a short-term, but also a long-term driver of innovation and economic and societal advancement.

An important related point is that because we have strong researchers across a wide range of fields, NUS serves as a large and comprehensive brain-trust for Singapore. None of us can foresee with certainty what specialties or expertise will be vital in the future. The NUS brain trust is therefore of great value as it enables NUS and Singapore to be more adaptable and responsive to the unpredictable demands of the future.

The second Pillar: Culture. For NUS to sustain its huge rate of progress, we must grow the **culture of excellence** in all parts of our university. By this, I mean that the accepted norm in our community must be for every member, every group, every department and School of NUS to continuously strive to be even better, to be constantly self-surpassing.

It also means that our university must provide the enabling environment that promotes and supports outstanding performance. In particular, teamwork and collaboration must be the norm within our community, where individuals who are doing well, work with others in NUS to promote excellence across a broad front.

Being exceptional is increasingly important as we enter an era of what I might term “the commoditisation of competencies”. For example, I am a terrible photographer whereas my wife Evelyn is highly skilled. But look at this recent photo I took during our trek in Ethiopia, and compare it with one taken by Evelyn. As Evelyn is not here this morning, I dare say that the two photos are very similar in quality!
The reason is, of course, I was using a fancy camera. It allows bad photographers like me to become above average photographers. What this also means is that very good photographers now need to be even more creative or find new ways to stand out. This commoditisation of competencies applies across many areas, from robotic surgery to computer assisted art. We need creativity and a deep culture of excellence to allow us to continue to stand out in the things that we do.

The third but most important Pillar: People. We must focus even more strongly on helping every student to discover and develop their potential. We need to work even harder to further raise the quality and impact of our faculty and staff, by nurturing and enabling our colleagues to do their best work and redoubling our focus on recruiting top talent. Besides stepping up faculty recruitment to augment our teaching and research strengths, we plan to grow the pool of faculty with the expertise and experience to work well with industry, and to bridge between basic research and application and commercialisation.

In the same way, we will also invest further in our administrative staff through training and new hires, and our ongoing work to implement our shared services framework, streamline procedures, and reduce complexity.

In summary, NUS will face a more challenging and complex external environment in the years ahead. Yet, we should continue to do well if our people are motivated to excel, by a deep culture of excellence and a strong sense of common purpose.
At this point, you may be thinking – this is all very good, but what does it mean in practice? What would we be doing differently and what should we be starting new? In this regard, I would like to announce two major new NUS thrusts.

Thrust One is centred on helping our students **maximise their potential and realise their aspirations**, both short- and long-term. We start from a strong position - our students are rigorously trained and well prepared academically. Employers tell us that our fresh graduates have a high level of competence, with solid analytic and problem-solving skills. As we work to maintain this strength, we will however put a much stronger focus on ensuring that students graduating from NUS also have a “can do” spirit, “can connect” with others and are continually learning.

![THRUSt 1](image)

This is because those leading teams or running organisations consistently tell us how much they value people who have a “can do” spirit, that is, people who show initiative, actively contribute ideas, are willing to take on things and to do them well. They also appreciate staff and colleagues who “can connect” with others. This means being able to communicate clearly, to build networks, and to work effectively in teams across cultures and disciplines.

For our students to develop these qualities, they need to be exposed to situations that stretch and test them as individuals and as teams. Take this year’s Rag and Flag, where some 1,800 NUS students put up wonderful performances at the Float@Marina Bay in front of an audience of 28,000 people. To give you a sense of the scale and quality of the event, here is a short video clip.
Our students did really well but what was most important, was that the entire event was fully run by them under the leadership of the NUS Students’ Union (NUSSU). The student leaders told me about the complex logistics, and many obstacles they had to overcome. On the day, heavy rain caused many problems but our students kept calm, the rain stopped and the show proceeded magnificently. I am certain the entire Rag experience would have strengthened the “can do” spirit of our students, and taught them how to connect well with others.

Roots and Wings

To help our students to gain the most from such experiential learning opportunities, the Centre for Future-Ready Graduates will be launching a novel programme which its new Director, Ms Crystal Lim, has coined the “Roots and Wings” initiative. In her words: “Roots stands for personal skills, and is about developing self-understanding and mastery. Wings stands for interpersonal skills including communication, networking, and collaboration which when coupled with personal mastery, will enable the individual to effectively navigate the wider world and contribute to society.”
The Centre is designing a number of new foundational programmes that will help our students understand themselves more deeply, discover their strengths, weaknesses and potential, and develop essential life skills that would equip them well for the future. These programmes will be piloted from next year, evaluated and then scaled. Some will be in partnership with our Faculties, Halls, Residential Colleges and study-abroad programmes, to help our students gain the maximal learning value from experiential programmes, through systematic self-reflection, sharing and mentorship.

To drive the Centre for Future-Ready Graduates’ programmes, we have allocated $10 million over the next three years to increase the number of professional staff and provide start-up funding for these new initiatives.

There is a nice line, attributed to a German proverb that captures the spirit of our collective effort here: “There are only two lasting bequests we can hope to give our children. One of these is roots, the other, wings.”

Lifelong Education and Development

It is vital for our students and graduates to have wings, but they also need to continually learn new ways of flying under different and changing conditions.

When I did some bird-watching in Itatiaia in Brazil, one of the highlights was watching at close range, the humming birds in flight. It was hypnotic seeing them hover like little motors, then zip off upwards, sideways, downwards or even backwards. It must be very exhilarating to be a young hummingbird learning to fly like that.
To help our students and alumni remain agile and responsive to change throughout their careers, and to serve Singaporeans more generally as part of the national SkillsFuture drive, NUS will significantly strengthen our emphasis on Continuing Professional Education. In line with this, we will be investing $20 million in two new initiatives.

Firstly, we will set up a new Institute for the Application of Learning Science (AppLS) with funding of $8 million: We are delighted that Professor Ranga Krishnan has kindly agreed to chair the Management Advisory Board that will help develop the vision and directions, and recruit key personnel. He brings deep knowledge and experience in the application of the science of learning and has worked closely with our Provost to conceptualise this Institute.

Our aspiration is to be a thought-leader in translating learning science to practice, so as to optimise the educational experience and outcomes. A key component will be a strong research programme to increase our understanding of the learning culture in Singapore and our region, evaluate the outcomes of educational initiatives, and define useful learning approaches.

The new Institute will kick off by developing two important new modules in a Blended Learning Online Course format. The module on “How to Learn”, would introduce and entrench learning approaches which have been shown by research to be effective for continual learning. The other on “How to Choose” will focus on how to frame and make decisions, especially in complex situations or where there is incomplete information.
I envision that the Institute will enhance the effectiveness of programmes across NUS, and provide useful data for policy-makers in Singapore and globally.

Secondly, we will establish a new **School of Continuing And Lifelong Education (or SCALE)**. SCALE would lead the development of the overarching vision and strategic goals for the Continuing and Professional Education effort at NUS. The School would actively engage employers and industry, to understand where the greatest training needs and mismatches are in Singapore.

It will then work closely with NUS Faculties and partners to develop and run a menu of continuing education courses, which are differentiated by their multidisciplinary approach and the academic strengths of NUS and our networks. Courses offered by SCALE will be largely online and designed with strong industry and employer inputs. Student selection will take into account work experience and prior learning, and not be solely based on academic background. The School will award degrees as well as Certificates and Diplomas which may be counted towards a full Degree.

The key goals of SCALE would be to enable Singaporeans, and NUS graduates, to skill and re-skill for existing or new jobs, and to help our companies and industries to stay competitive by providing lifelong learning opportunities for their employees. As many of the courses from SCALE will be online, they will also be accessible to, students not just in Singapore but from around the world.

Let me turn now to the second major thrust, which is to build two signature initiatives that maximise our researchers' impact in areas of great importance to Singapore, but which are very complex and difficult. I will refer to these as Solutioning Networks as they will draw on all relevant expertise across NUS to work with public and private-sector partners on defined problems. The aspiration is for NUS to become an acknowledged global leader in developing novel solutions in these very challenging areas.

Earlier this year, I chanced on a Straits Times article about north Pakistan. It caught my eye because I have many fond memories of travelling in that area - the towering mountains, spectacular valleys, and picturesque villages – Husseini, Pasu, Sust. I was really surprised though to read that there is now a road through the nearby Shimshal Valley. When Evelyn and I were backpacking there in 1993, we made a side-trip to the Shimshal Valley. It was a very bumpy jeep ride arranged by our inn keeper. As there was not enough space, his son perched on the roof of the jeep and
we were amazed that he was not thrown off into the precipice below. The mountains were very sheer and bare. We came to a little camp site where a handful of workers lived – they were manually gouging a road out of the living rock with pickaxes and hammers. They told us that they could extend the “road” by less than 4 km each year. This was in 1993, and now there is a road through the valley.

It stands as a powerful reminder of how seemingly insurmountable challenges can be overcome with purpose, grit and determination. This sentiment is best captured for me by the bright yellow signs put up by the Border Roads Office along the mountain roads of north India, particularly this one which reads:

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In previous Addresses, I have described many initiatives to broaden and deepen our research excellence and to translate our research into useful applications. These include the setting up of Integrative Research Clusters, developing sectoral partnerships with industry collaborators and boosting our enterprise ecosystem.

The NUS Solutioning Networks would take these one major step further. The two selected areas represent particularly important challenges and opportunities for Singapore and both are highly complex. These are Healthcare Transformation; and Smart Nation Research.

The NUS Solutioning Networks will work with a network of private and public sector partners and testbeds, to define the areas within these national efforts where the comprehensive research strengths of NUS can catalyse and drive innovative programmes, and find solutions that would significantly advance our progress.

The Solutioning Network for Health will be a joint effort between NUS and the National University Health System (NUHS) and will work closely with the Ministry of Health to support its overall health innovation framework.

Singapore has a world-class health system which delivers high quality care which is accessible and affordable. However, our health system, like those of most other countries, needs to shift from care delivery centred on specialists and tertiary hospitals, to re-position for a future where we will have many more elderly people, and patients with multiple chronic diseases. NUHS, NUS and other partners will work together to develop new health delivery models centred around the patient, who would access care largely in his or her home under the supervision of a dedicated
primary healthcare team and supported by easy-to-use technology which we would develop, in-source and integrate.

Thanks to the leadership of NUHS Chief Executive John Wong, we have developed a framework for our combined effort, and a joint fund of $6 million to enable the work.

A part of this effort will involve community studies to understand the social, health and other factors which influence how patients and their families decide when they seek healthcare, the type of services they choose and why. We will also work with MOH on innovating new inpatient services that are generalist-led and specialist reinforced, and designed from beginning to end, to provide holistic care. In addition, NUHS and NUS will test different financing approaches that promote and enable more integrated care of patients as they cross primary, hospital and step-down care sectors. Such data would be useful to support the re-design of care pathways, and for policy makers.

The second NUS Solutioning Network will be in Smart Nation Research. Here, the key components are data science, analytics and optimisation, and cybersecurity. NUS already has extensive strengths in data analytics, operations research and cybersecurity. With support from the National Research Foundation, we are building the National Cybersecurity R&D Laboratory, and working to establish a Cybersecurity Consortium. We are also in the process of setting up a new Data Science Institute which would bring together and augment our expertise in data analytics and optimisation. In addition, advanced discussions are underway to develop private and public sector partnerships which would allow us to make differentiated and world-class contributions in these areas.

Global Alliance

Just two weeks ago, I was in the University of California, Berkeley, to sign a letter of intent with the Chancellor of Berkeley and Vice Chancellor of Cambridge, for our three universities to work on an agreement to establish a new Global Alliance. This would strongly enable faculty from Berkeley, which is the top public university in the United States, and Cambridge and NUS, the top universities in Europe and Asia respectively, to work closely together on a small number of major global issues, pooling our substantial intellectual resources and leveraging our complementary perspectives and expertise.
For NUS, the proposed new Global Alliance will open major new ways by which we can make deep and meaningful contributions in health transformation and smart nation research and development. In addition, I expect that work in these areas will likely produce exciting opportunities for application and commercialisation. Last year, I reported that NUS start-ups and spin-offs had raised more than $120 million in the preceding five years. In just nine months since (Oct 2014- July 2015), companies in our community have raised over $220 million in follow-on funding.

Our continued focus on boosting the translational impact of NUS research, and the launch of these two signature initiatives, will further quicken the pace of commercialisation of NUS technologies to bring greater benefits to Singapore and the world.

Closing

Our strong commitment to serve Singapore and society is a constant that has remained unchanged between 1965 and today. What has changed is that today, our university has world-class intellectual resources across a wide range of areas, and the capacity to lead and contribute at a truly global level. It seems unlikely that Vice Chancellor Professor Lim Tay Boh and his colleagues could have imagined that NUS in 2015 would be recognised globally as the top university in Asia and one of the leading universities in the world.
However, even as NUS is consistently highly ranked in international rankings, we must continue to look beyond them. This is because international rankings by necessity, can only capture some dimensions of a university's overall achievement, and they yield league tables which are highly dependent on the criteria used and how these are changed.

Instead, our focus must be on the distinctive value that we are creating as a world-class university rooted in Singapore. In particular, we must constantly ask how well we are helping our students to maximise their potential to be critical thinkers and effective problem solvers, and who also have a strong “can do spirit”, who “can connect” well with others, and are continually learning. Even as we carry on building world-class basic research strengths, we need to ask how we can do even more to use our comprehensive expertise to help address complex challenges such as healthcare transformation and smart nation research, which are of fundamental importance to Singapore and the world.

Colleagues and friends, as I outlined NUS future plans in this Address, I realised that I have gravitated once again to talking about mountains. This year, I spoke about the Simien Mountains in Ethiopia.

This adds to the growing list of mountains we have discussed in past years such as Machu Picchu in Peru; the Indian Himalayas; Mount Jomolhari in Bhutan; and the circumambulation of Mount Kailash in Tibet.
One of our senior alumni, Johnny Tan pointed out to me that we are missing an underwater experience, so this morning I am sharing a photo from a scuba diving trip last year. It was very special because we had the rare pleasure of seeing the oceanic sunfish, or mola mola, twice on the first dive. The mola mola is an odd-looking but fascinating creature, the largest bony fish on our planet. It was particularly thrilling to see it that day because it was also my birthday! There is a lesson here as well, which is that besides excellent strategies and plans, having good luck does matter too!

Although our mental explorations have brought us to many parts of the world, and have led us to think fresh, bold thoughts and pursue exciting new ideas, the fundamentals for our university have remained constant throughout. People,
Culture and Purpose lie at the heart of what we do. We need to build an ever deeper culture of excellence and a strong sense of common purpose centred on creating distinctive value. This will excite and impel all of us, the talented people of NUS, to excel in education and research at the highest levels, and to find deep satisfaction in making meaningful contributions to the advancement of society.

As we look back at how far we have come in the past 110 years, I urge you to continue giving us the full force of your talent and passion, to add to our gathering strength, to give another 110 percent, to help NUS move strongly upward in the years ahead, as a leading global university centred in Asia, influencing the future, creating distinctive value.

Thank you.

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